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Service and User
Manual

Hewlett-Packard
SureStore E SCSI Bridge FC 4/2

Hewlett-Packard
SureStore E SCSI Bridge FC 4/2

HEWLETT PACKARD

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Safety Instructions

Service

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

	Denotes
WARNING	**A hazard that can cause personal injury**
Caution	A hazard that can cause hardware or software damage

Format Conventions

	Denotes
Note	Significant concepts or operating instructions
command	Text to be typed verbatim: all commands, path names, file names, and directory names
`xyz`	Text displayed on the screen
<**KEY**>	Keys to be pressed, for example, the <Return> key

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1 PRODUCT DESCRIPTION

Introduction

Features

Introduction

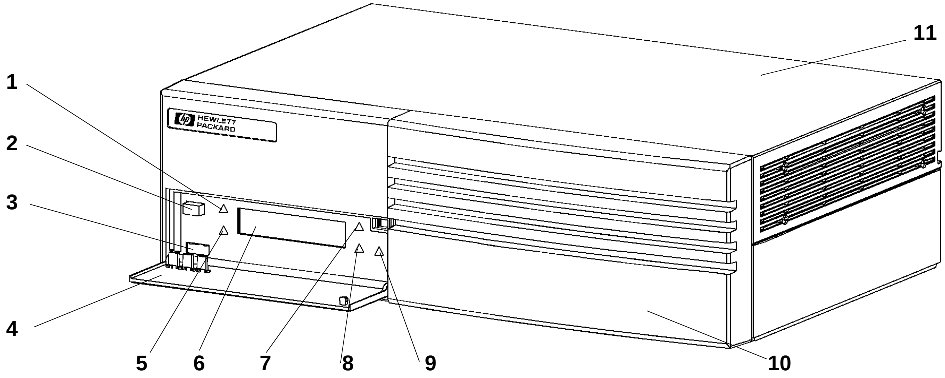
As technology changes, demand continues to rise for faster and larger transfers of data over greater distances between a host and peripherals. Conventional methods of meeting these demands have relied on purchases of expensive CPU upgrades or changes to technology that provided faster transmission of data. Fibre Channel (FC) technology achieves high performance levels for operations that require fast transfers of large amounts of data between a host and peripherals. To use FC technology, however, each system must be able to “speak FC,” and meeting this requirement usually means expensive purchases and time-consuming conversion, migration of data, and installation of FC-compatible hardware systems and peripherals.

Hewlett-Packard’s solution, the SureStore E SCSI Bridge FC 4/2 (SSB), is a customer-installable peripheral that allows an FC host to use FC technology to transmit data to SCSI-based peripherals. In addition to faster transfers of data, the SSB enables greater flexibility in the design of data centers. With the SSB, customers can extend the distance between a host and peripherals and expand the number of SCSI devices connected to the host. The SSB multiplexes the inputs and outputs from a single FC connection to as many as four SCSI buses. Because each bus supports 15 devices, one SSB can support up to 60 devices (with varying levels of performance).

The following figures show the SSB’s external features.

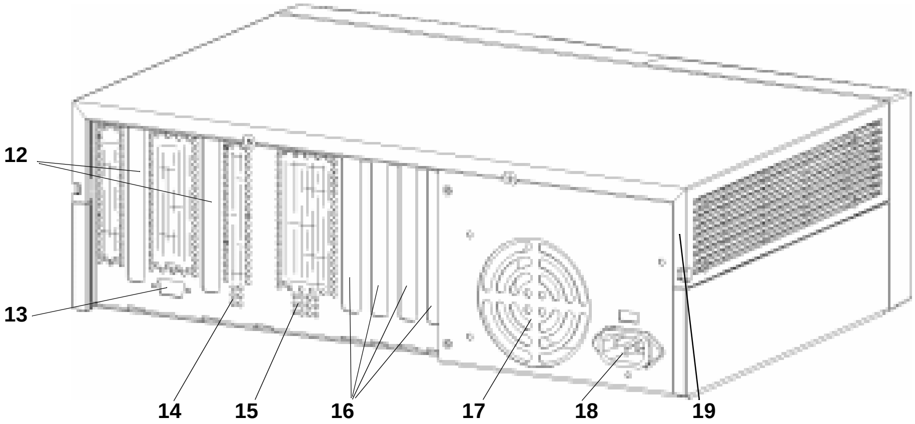
For part numbers, see chapter 7, Reference.

For details on front and rear panel LEDS, see LED Indicators on page 67.



1 - Menu button
2 - Power button
3 - Power, Activity, Fault LEDs
4 - Front door
5 - Cancel button
6 - LCD
7 - Up button
8 - Down button
9 - Enter button
10 - Front bezel
11 - Cover

Figure 1 SureStore E SCSI Bridge FC 4/2 Front Panel



12 - Ports FC A and B
13 - RS-232C Serial Port
14 - LED FC A and B
15 - SCSI LEDs 0 to 3
16 - SCSI Ports 0 to 3
17 - Fan vent (power supply)
18 - AC power inlet
19 - Cover

Figure 2 SureStore E SCSI Bridge FC 4/2 Back Panel

Features

The SSB is easy to install, use, and support. It has a preset loop address (0) and automatically recognizes connected devices. The SSB loop address may need to be changed to avoid conflict with another device in a multinode loop, but no other configuration is required.

The SSB features:

- Customer-upgradeability: Customers can easily add FC and SCSI adapters to the SSB. (Maximum capacity is two FC adapters and four SCSI adapters.)
- No configuration for newly added devices: The SSB automatically recognizes the presence of an added device. (The host requires other commands such as ioscan before it recognizes the device.)
- Remote access and diagnostic control of devices connected to the SSB using SAM, HP-UX commands, Support Tools Manager, and other programs on the host
- Upgradeable firmware through the host
- Extended number of device connections to the host
- Two-node loop topology

How the SSB Works

The SSB acts as a pass-through device that receives and transmits FC packets. The host passes packets to SCSI devices as if the SSB were just another device along the path. The following figures show a typical two-node loop topology in which each FC adapter is connected to another Fibre Channel device.

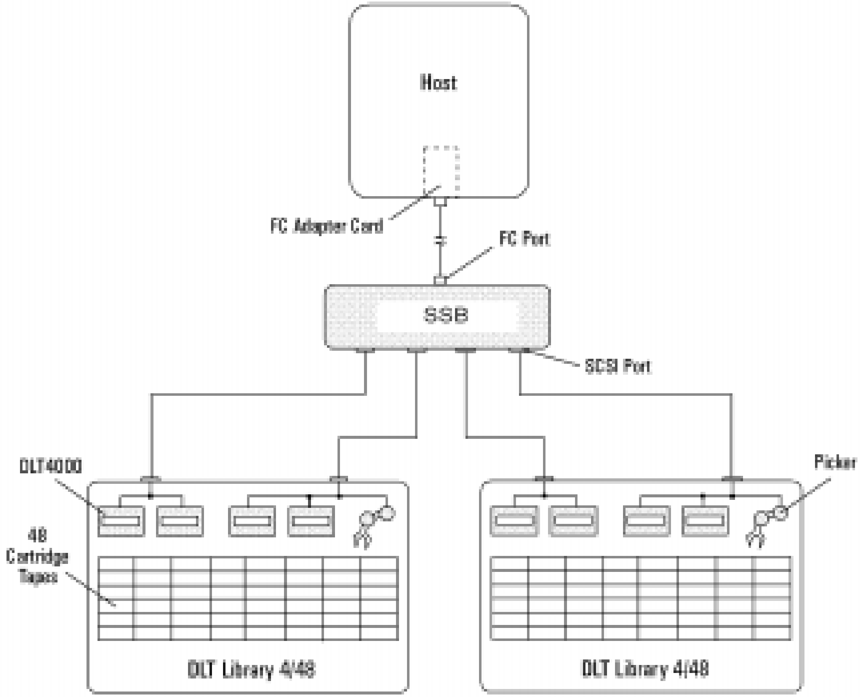


Figure 3 Two-Node Loop Topology with Tape Library Peripherals

The SSB allows access to multiple standard SCSI buses and peripherals (also referred to as SCSI devices) by an FC interface or connector. The product takes advantage of Fibre Channel's ability to encapsulate SCSI protocol to allow a host with an FC adapter to access SCSI peripheral devices transparently over a Fibre Channel connection.

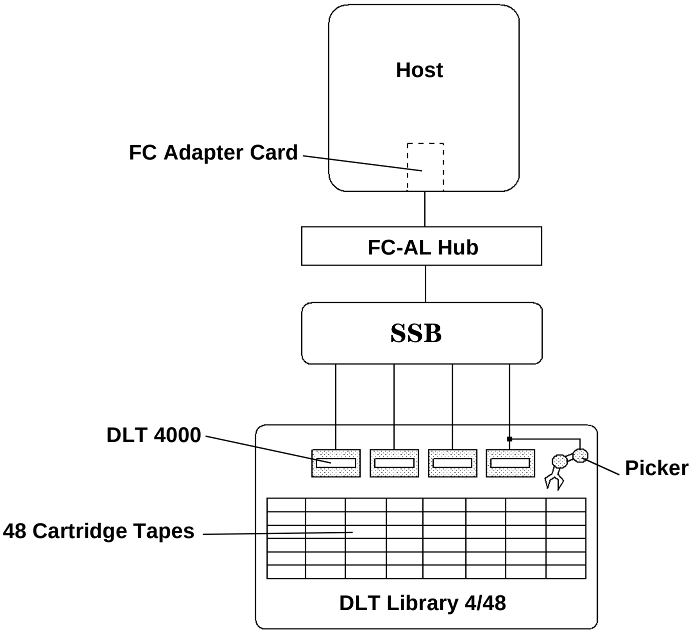


Figure 4 Two-Node Loop Topology with a Hub and Tape Library Peripherals

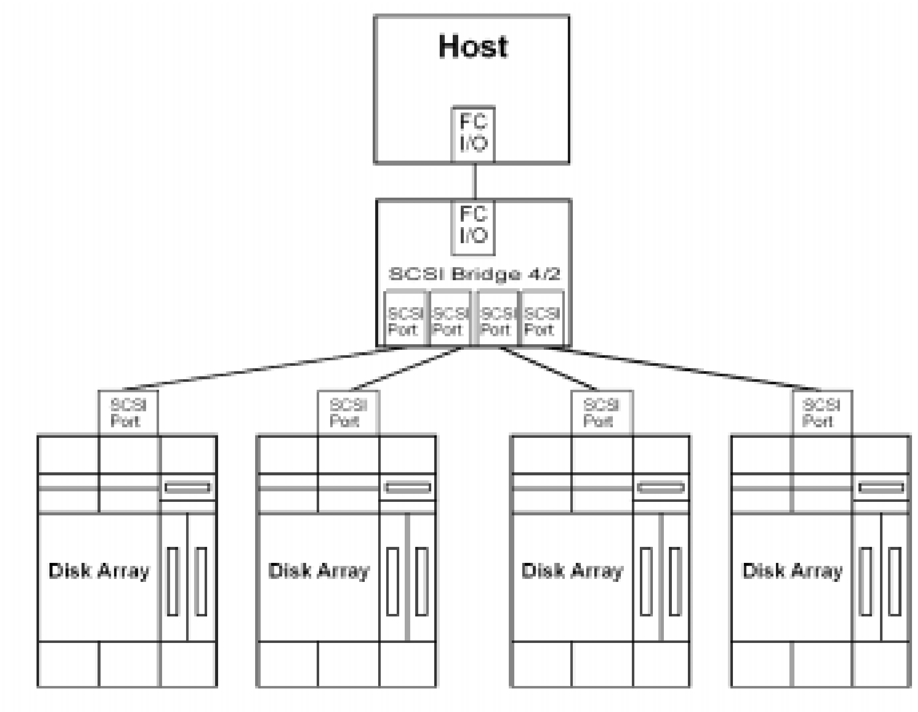
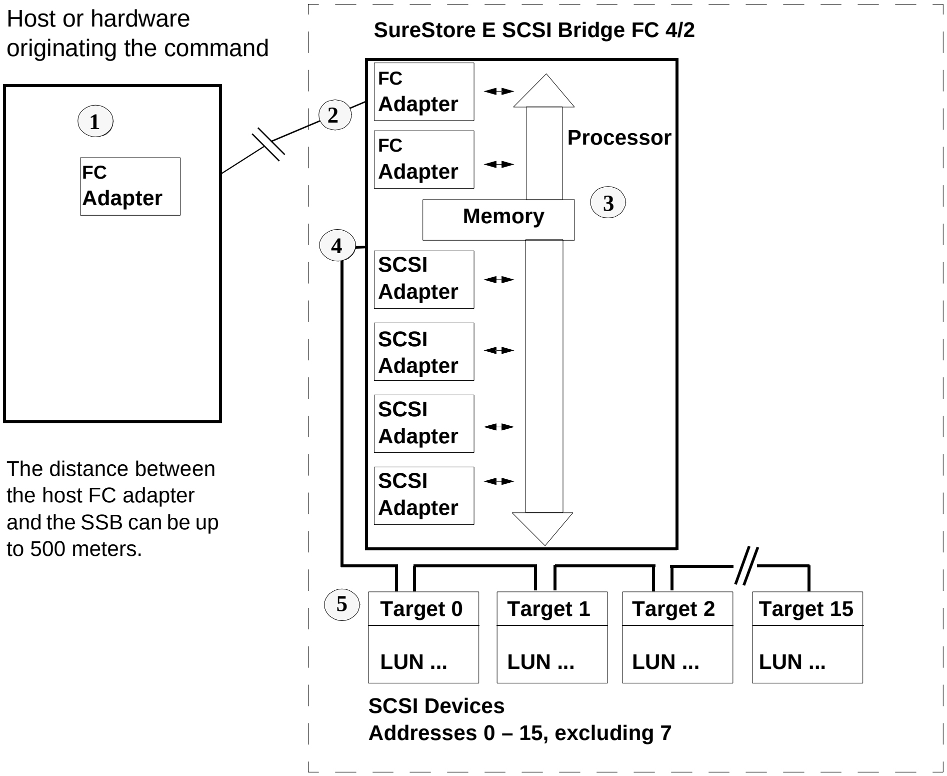


Figure 5 Two-Node Loop Topology with Disk Device Peripherals


Host or hardware originating the command
1
FC Adapter
The distance between the host FC adapter and the SSB can be up to 500 meters.
SureStore E SCSI Bridge FC 4/2
2
FC Adapter
FC Adapter
Processor
3
Memory
4
SCSI Adapter
SCSI Adapter
SCSI Adapter
SCSI Adapter
5
Target 0
LUN ...
Target 1
LUN ...
Target 2
LUN ...
Target 15
LUN ...
SCSI Devices
Addresses 0 – 15, excluding 7

(1) The host issues a SCSI command. The FC adapter encapsulates the command in the FC protocol and sends the packet to the SSB.
(2) The FC adapter in the SSB receives the packet, strips the header, interprets the FC information, and places the packet in memory.
(3) The processor interprets the SCSI information and programs the appropriate SCSI and FC adapter to process the transaction.
(4) The SCSI adapter sends the command to the SCSI device (target).
(5) The target interprets the command and prepares to act.
Data flows from the target to the host through memory.

Figure 6 How the SSB Processes SCSI Information

What the Control Panel Does

The control panel allows the user to:

- Initiate the self test (power cycle the SSB)
- Take an individual SCSI bus offline and online
- Place the SSB in offline mode and conduct diagnostic tests
- Set the loop address of an FC adapter
- Reset an FC adapter and SCSI bus
- View the error logs and error messages
- View the SSB location and Node Name
- Get status on the SSB, its components, and its connections to other devices

Chapter 4, Using the Control Panel, describes all functions of the SSB through the control panel.

Functions that cannot be controlled from the control panel are:

- Setting SCSI software or hardware addresses
- Setting FC speed, topology, or configuration
- Setting the SSB location

How the Self Test Works

The SSB self tests every time it is power cycled (reset). When the SSB power cycles, all LEDs blink on, then off. During the self test, the front panel LCD displays a stream of numbers and then the name of each component being tested. The results of the self test are displayed and stored in the SSB’s internal log.

If the SSB passes the test, the LCD Display shows the number of adapters detected and the state of each adapter.

If the SSB detects an internal error, the Fault LED lights up and, depending on the severity of the error, the following events occur:

- When a part fails with a nonfatal error, the error is logged and the self test continues.
- When a part fails with a fatal error, the error is logged, the LCD shows the component that failed, and the self test terminates.

How Offline Works

The SSB goes offline when the Diagnostics Menu is selected and the user selects “yes” to the question “Take SSB offline for diagnostics?” Before the SSB goes offline, inputs/outputs are terminated. The front panel Fault LED and all six Install LEDs on the back panel blink when the SSB is offline. The symbol “–” displays next to the ID of the affected FC in the Slot Status Screen to indicate that the SSB is offline. For more information, see Diagnostics Menu on page 95.

How the SSB Comes Online

The FC side of the SSB will attempt to communicate with the SSB or the Hub by being prepared to accept inputs/outputs. If the device is not responding during this time, the symbol “?” displays next to the ID of the affected FC adapter on the Slot Status Screen. When the SSB is communicating with the host or Hub, the symbol “+” displays on the Slot Status Screen.

2 INSTALLATION

- Installation Overview
- Unpack the Box
- Test the SSB Unit
- Preparation Checklist
- Verify Requirements
- Prepare the Tape Devices to be Moved (Optional)
- Prepare the Disk Devices to be Moved (Optional)
- Configure SCSI Devices
- Mount the SSB in a Rack (HP A3511A)
- Connect the SCSI Devices to the SSB
- Test the SCSI Device Connections
- Connect the SSB to the Host FC Adapter
- Check the SSB to Host Connections
- Relocating Logical Volumes
- Logically Reconnecting Tape Libraries to the Host

Installation Overview

Read this chapter completely before working on the SSB, host, or peripheral devices.

Note Tapes are supported on firmware revisions 3720, 3806, 3810 and 3840. Disks are not supported on firmware revision 3720.

Caution Attaching both disk and tape devices on the same SSB is not supported due to performance degradation.

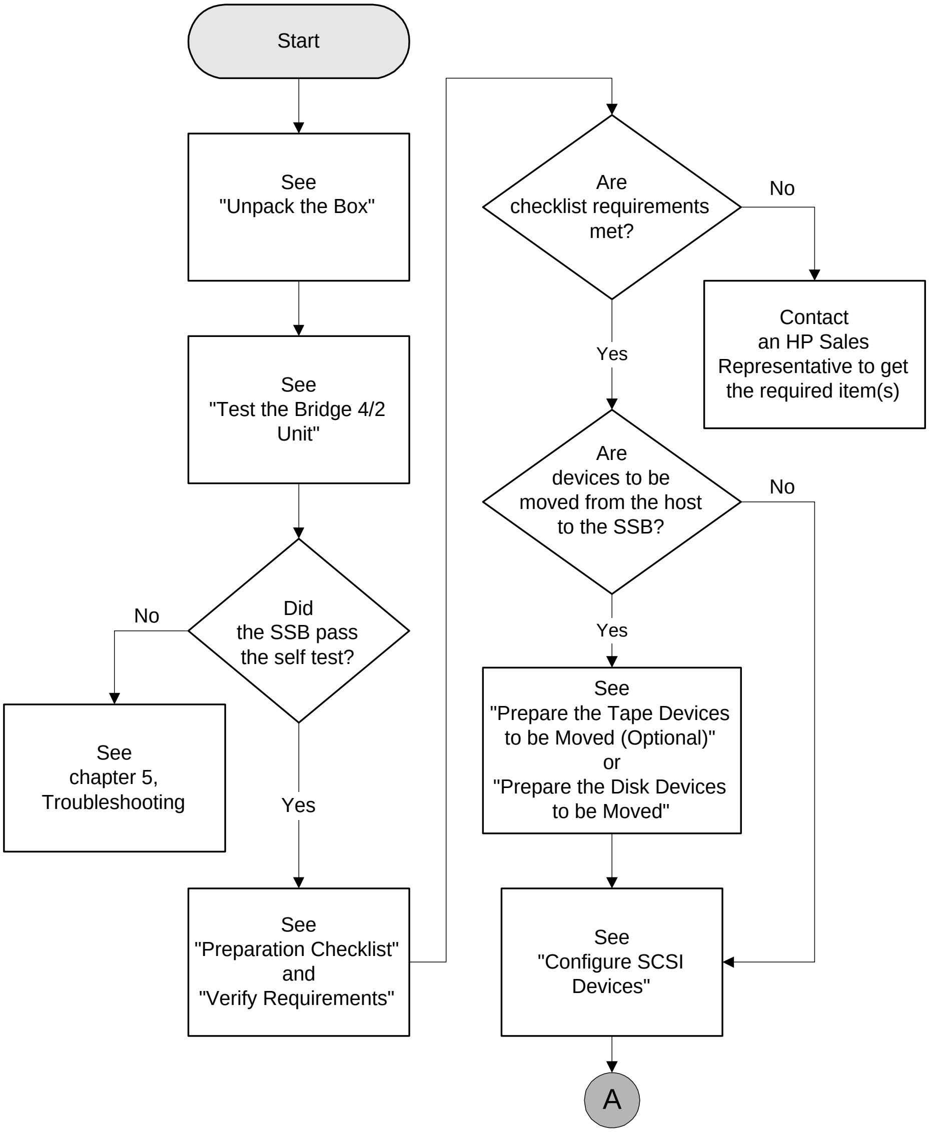
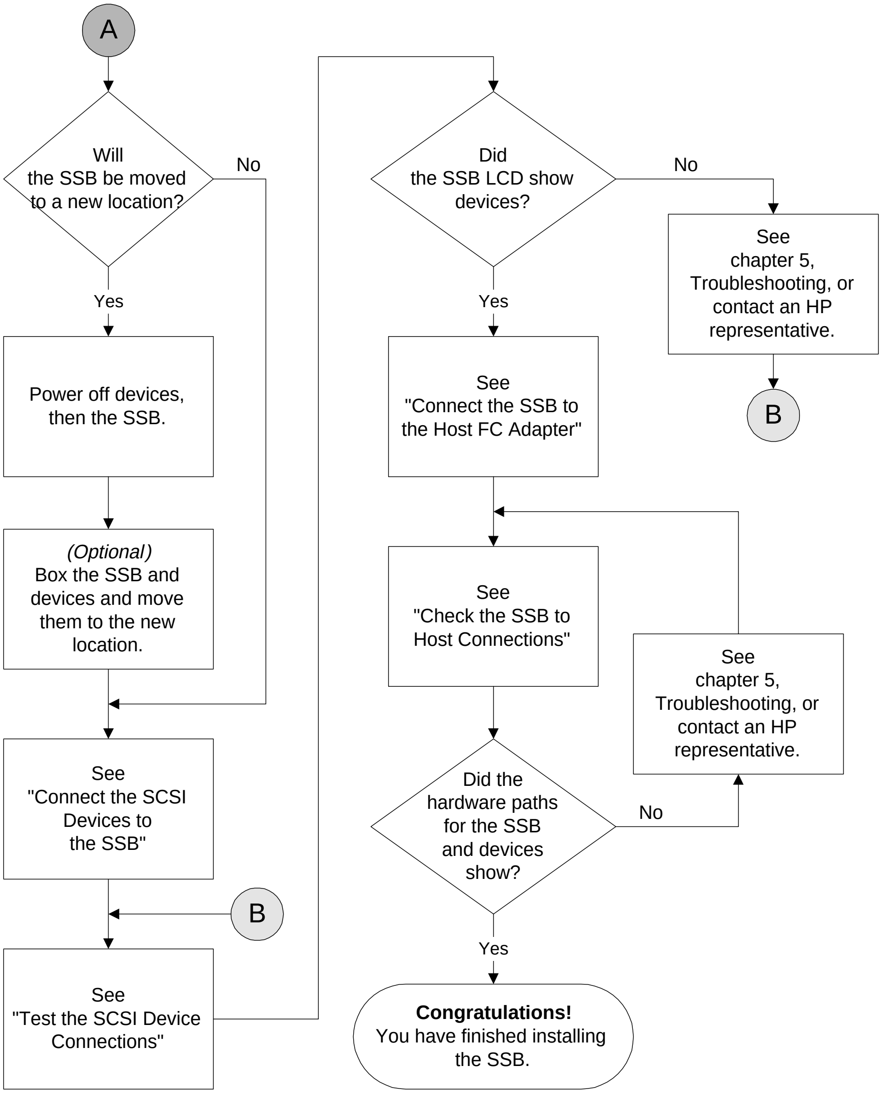

Start
See
"Unpack the Box"
See
"Test the Bridge 4/2 Unit"
Did the SSB pass the self test?
No
See chapter 5, Troubleshooting
Yes
See
"Preparation Checklist"
and
"Verify Requirements"
Are checklist requirements met?
No
Contact an HP Sales Representative to get the required item(s)
Yes
Are devices to be moved from the host to the SSB?
No
Yes
See
"Prepare the Tape Devices to be Moved (Optional)"
or
"Prepare the Disk Devices to be Moved"
See
"Configure SCSI Devices"
A

Figure 7 SSB Installation Overview


A
Will the SSB be moved to a new location?
No
Yes
Power off devices, then the SSB.
(Optional) Box the SSB and devices and move them to the new location.
See "Connect the SCSI Devices to the SSB"
B
See "Test the SCSI Device Connections"
Did the SSB LCD show devices?
No
Yes
See chapter 5, Troubleshooting, or contact an HP representative.
B
See "Connect the SSB to the Host FC Adapter"
See "Check the SSB to Host Connections"
See chapter 5, Troubleshooting, or contact an HP representative.
Did the hardware paths for the SSB and devices show?
No
Yes
Congratulations! You have finished installing the SSB.

SSB Installation Overview (cont'd)

Unpack the Box

1. Remove the items from the HP shipping container. Check each one for damage. If any item is missing or appears damaged, contact an HP sales representative immediately.
2. Refer to Standard Configuration on page 162 and HP A3308A, HP A3511A, and HP A3511AZ Configuration Options on page 164 to make sure you have the appropriate pieces.
3. Select a location where the SSB can be disconnected easily from an accessible power outlet and is safe from tripping hazards.
4. Do not connect any cables between the `SSB`, host, or devices until the SSB is tested.

WARNING **The power cord is the main disconnect for this product. Connect only to a grounded AC outlet. To make sure the power cord can be disconnected quickly, locate the SSB near an easily accessible power outlet.**

To avoid a fire hazard, the AC branch service must be properly current-protected by either a fuse or a circuit breaker. Use only HP-provided power cords rated for suitable voltage and current. The power cord has two conductors and a ground. Failure to use the proper power cord may result in a shock or fire hazard.

Note The SSB power suppy is auto-ranging and will operate without changes over an input range of 100 to 127 V AC and 200 to 240 V AC ± 10%.

Test the SSB Unit

This step takes only a few seconds to complete. Power on the SSB unit and verify that it passes the self test. For more information, see chapter 4, Using the Control Panel, and the SSB Control Panel Quick Reference, which is shown in the appendix.

Each time the SSB is powered on or power cycled, it automatically self tests its internal components. For complete diagnostics, see chapter 5, Troubleshooting.

SSB Power-On Sequence

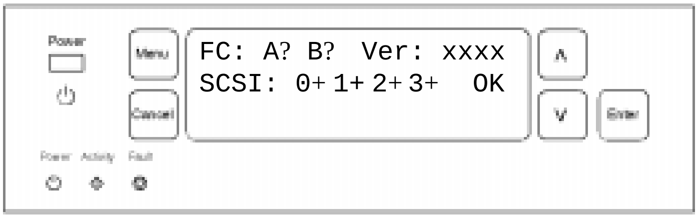
1. Plug in the power cord. Open the door on the front panel. Press <**POWER**>. The SSB automatically self tests its internal components. For example, the SSB displays:

   ```
   Self testing...
   <the name of the component being tested>
   ```

   The self test takes less than one minute to complete.

2. If the LCD displays letters and numbers, as shown in the example below, continue to the next step.

   The following is an example of a screen showing that the SSB detected adapters FC A and B and SCSI adapters 0, 1, 2, and 3.



```
FC: A? B?  Ver: xxxx
SCSI: 0+ 1+ 2+ 3+   OK
```

The Quick Reference Card explains all the fields (see appendix).

3. Inspect the Slot Status Screen for the correct number of FC and SCSI adapters. For example, if the SSB invoice shows that two FC adapters were ordered and FC adapter B does not display on the Slot Status Screen, either the adapter has a problem or it is not installed. For information on LEDs, see LED Indicators on page 67.
4. If an error message appears on the screen, see Viewing the Error Log on page 89 and Error (ERR) Mode on page 93.
5. View the FC loop address and verify that no other device on the loop has the same address. Reset the FC loop address to a unique number if needed. See Using the SCSI Admin Menu on page 84.
6. Power off the SSB when finished.

Preparation Checklist

Make sure that the following requirements have been met:

- The host operating system is version 10.20 or later. For information on how to check, see Verify Requirements on page 31.
- The host FC adapter ordered has been installed (see Operating Requirements on page 171).
- The FC driver has been installed. For information on installing and configuring the driver see the *HP Fibre Channel Mass Storage Adapter Service and User Manual* (A3636-90002) and any associated release notes.
- The FC adapter in the host is the same speed and wavelength as the FC adapter in the SSB.
- The correct FC cable is available (see an HP sales representative).
- The new location of the SSB has sufficient space to allow easy access to the back of the SSB or the rack.

Have the following reference documents available:

- The manual that came with the SCSI device

  "Device" means a SCSI-based storage enclosure, storage device, or disk array.
- *HP-UX System Administrative Tasks Manual* (B2355-90079)
- *Configuring HP-UX for Peripherals* (B2355-90053)
- SSB Control Panel Quick Reference Card (included with the SSB)

If the SSB is going to be located a distance away from the host, plan to connect the FC cable to the host and route the cable to the SSB location, but DO NOT connect the FC cable to the SSB yet. The host can operate while the FC cable is connected to the host FC adapter.

Verify Requirements

Follow the steps below to determine if the FC driver is installed on the host. The SSB drivers are installed when the FC adapter is installed.

Skip to Configure SCSI Devices on page 39 if you are installing a new system (for example, a new system that includes a host, SSB, and devices).

For details on hardware requirements, see Hardware and Software Requirements on page 171.

1. To determine the operating system (OS) version, type the following command:

   uname -a

   The third item in the output (B.10.20) is the release number and should be 10.20 or later, as shown below:

   ```
   HP-UX sysname B.10.20 U 9000/804 ###### license
   ```

   The letter following the release number is the version identifier, “U” in this example. Your version might be different.

2. (A system manager or HP-qualified service person should perform this step.) To verify if the SSB drivers fcT1_fcp, fcpmux, and fcT1_cntl are installed, type **sam** at the HP-UX prompt.

3. Select Kernel Configuration from the SAM main window.

4. Select Drivers.

   Verify that the following drivers are installed:

   ```
   fcT1_fcp fcpmux fcT1_cntl
   ```

5. If any driver is missing, install it. Refer to the “HP 9000 Systems” section in the *HP Fibre Channel Mass Storage Adapter Service and User Manual* (A3636-90002) for detailed information on installing drivers.

Note It is important that the FC adapters in the host connect to the same type and speed (1063 Mbps) of FC adapters in the SSB. If they do not match, the connection will not work.

6. Look at the host's Fibre Channel adapter label and the label on the back of the SSB Fibre Channel adapter's bulkhead. They should be the same wavelength type and speed. If the adapters are not the same, contact an HP service representative for help.

Prepare the Tape Devices to be Moved (Optional)

When installing a new tape library to work with the SSB, refer to the tape library's installation manual for detailed instructions.

When moving a tape library from the host to the SSB, no special physical or logical preparation is necessary. Once the tape library has been physically moved and connected to the SSB, the library must be logically reconnected to the host (see Logically Reconnecting Tape Libraries to the Host on page 50). For device-specific information, refer to the tape library manual.

Prepare the Disk Devices to be Moved (Optional)

To migrate SCSI disk devices from the host to the SSB, the SCSI device paths will need to be changed.

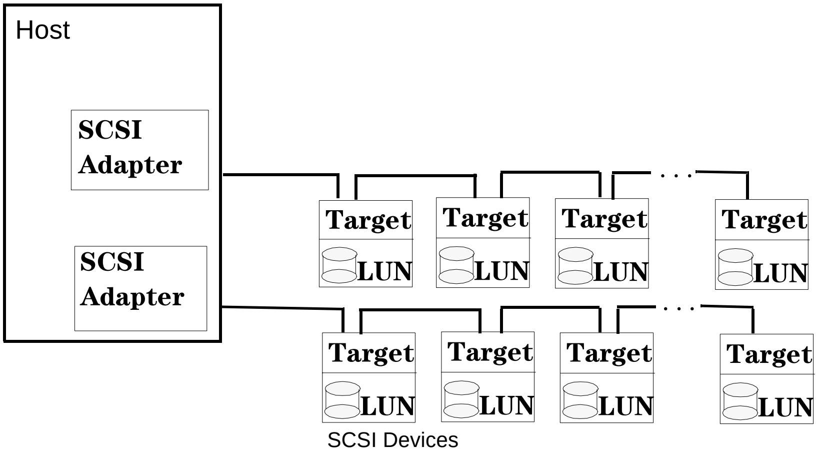


Figure 8 Before Devices are Moved from the Host

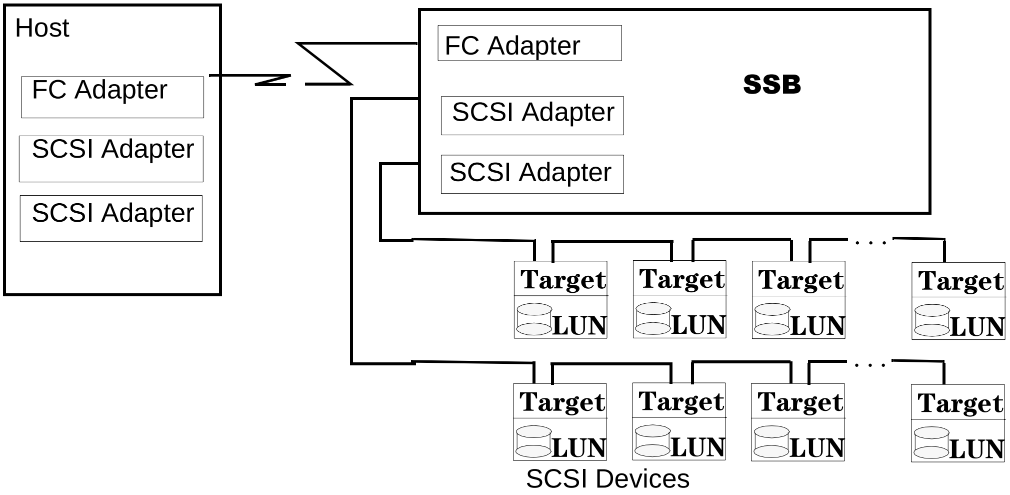


Figure 9 After SCSI Devices are Moved to the SSB

If the host has logical volume units, use the appropriate VG and LV software commands to logically move the existing volumes before disconnecting the devices from the host. The paths will change because the SCSI devices that have been connected to SCSI adapters in the host will now be connected to an FC adapter in the host.

1. Review the steps in the “Moving a Disk Drive to a Different Address” section of the manual *Configuring HP-UX for Peripherals* (B2355-90053). An important part of this step is data backup.
2. To determine how file systems are linked to the logical volumes and volume groups, type **bdf** and a file system list will display. Save this information in order to complete later steps.

Note Mount any unmounted volumes by using the command **mount-a**.

Example output:

```
#bdf
Filesystem         kbytes    used     avail     %used   Mounted on
/dev/vg00/lvol3    86016     17166    64551     21%     /
/dev/vg00/lvol1    123605    19310    91934     17%     /stand
/dev/vg00/lvol8    573440    27579    511781    5%      /var
/dev/vg00/lvol7    409600    230230   167917    58%     /usr
/dev/vg00/lvol6    81920     1512     75424     2%      /tmp
/dev/vg00/lvol5    204800    105704   92957     53%     /opt
/dev/vg00/lvol4    20480     1109     18165     6%      /home
/dev/vg001/lv001   2504465   201441   2052577   9%      /move1
/dev/vg001/lv002   1402473   402875   859350    32%     /move2
       |     |                                             |
      volume logical                                       mount
      group  volume                                        point
```

According to the example, logical volume “lv002” of volume group “vg001” is mounted to “/move2.” Do not move a volume group that contains the root file system (vg00).

3. Determine what disks, or physical volumes, are used to build a volume group. You will need to know this to properly restore access to the volume group later. Use the command **vgdisplay -v** to get this information.

   Example output:

```
#vgdisplay -v vg001
- - - Volume groups - - -
VG Name/dev/vg001
VG Write Access read/write
...
...output deleted
...
- - - Physical volumes - - -
PV Name /dev/dsk/c2t14d1
PV Status available
Total PE2002
Free PE2002

PV Name /dev/dsk/c3t6d0
PV Status available
Total PE2002
Free PE2002
```

The example output shows that vg001 is made up of physical volumes (disks) /dev/dsk/c2t14d1 and /dev/dsk/c3t6d0. Physical volume /dev/dsk/c2t14d1 represents a disk device that is on card instance 2, SCSI target ID 14, LUN 1. (See the "Understanding Device Special File Names" section of the manual *Configuring HP-UX for Peripherals* for a more detailed description.) After moving this disk device to the SSB, the card instance of this device will change. The SCSI target ID and LUN number will stay the same, unless they have been changed.

Note The SCSI Target ID can remain the same unless it is 7, because 7 is reserved for the SSB.

If using Physical Volume Groups (PVG), that information will also be displayed in the vgdisplay output. Save this information so that the PVGs can be recreated later.

4. Starting the SAM utility:
   - Type **sam**
5. To unmount all file systems to be moved:
   - Select Disks and File Systems
   - Select File Systems
   - Select the file system to be unmounted
   - Select the Action menu
   - Select Remove (the file system is still intact on the disk)
   - Select Yes in the confirmation box

6. To export the volume group:
   - Select the List menu
   - Select Volume Group
   - Select the volume group to be moved
   - Select the Action menu
   - Select Export
   - Provide a Map File Name to import the volume group to later (Use a different name for each volume group being exported.)
   - Select OK to complete the VG export
   - Select Yes in the confirmation box
7. Power off the device(s) as described in the manual that came with the device. Power off the host as described in *HP-UX System Administration Tasks* (B2355-90079).
8. Disconnect the device from its current location.
9. Connect the FC cable to the host. Route the cable to the SSB location but do NOT connect the FC cable to the SSB yet.
10. Power on the host.

Note Refer to Figure 7 on page 25 for SSB installation questions.

Configure SCSI Devices

The SSB supports up to 16 physical devices: 15 devices per bus plus the SSB, which always uses address 7. The user assigns a unique address to each SCSI device.

Note The SCSI device ID assigned by the user is the ID that will be displayed in the SSB LCD. The user can assign IDs 0 to 6 and 8 to 15. SCSI ID 7 is reserved for the SSB. Use Table 1 as a guide when setting up the device.

Table 1 SCSI Bus Requirements

Interface Type	Max Transfer Rate (Mbytes/Sec)	SCSI Cabling Total Length*	Number of Devices	SCSI Terminator
16-bit Fast Wide Differential	20	25 meters	SCSI Bus Adapter +15	Active

* Include any cabling internal to the device when calculating the total length.

1. Configure the physical settings on the SCSI device. Refer to the manual that came with the SCSI device for details on how to set SCSI addresses. To configure the paths from the host, refer to *Configuring HP-UX for Peripherals* (B2355-90053).
2. Make sure each end of the SCSI bus is terminated as needed. The host bus adapter is one end of the bus. It includes its own termination and also provides termination power. The other terminator is on the last device. Use a terminator for SCSI buses not connected to a device.

Mount the SSB in a Rack (HP A3511A)

Rackmounting Kit part # A3308-70000

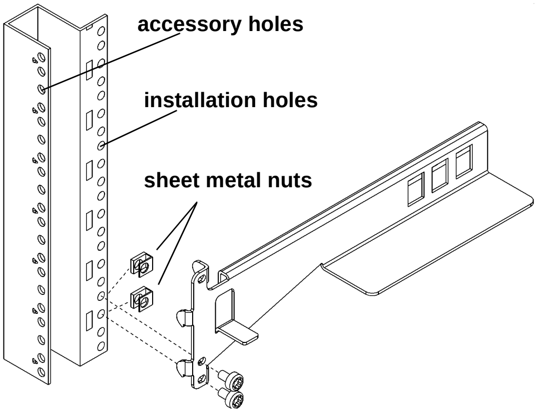
Optional: Test the SSB before mounting it in the rack (see Test the SCSI Device Connections on page 43).

Required tools: Standard Torx screwdriver set

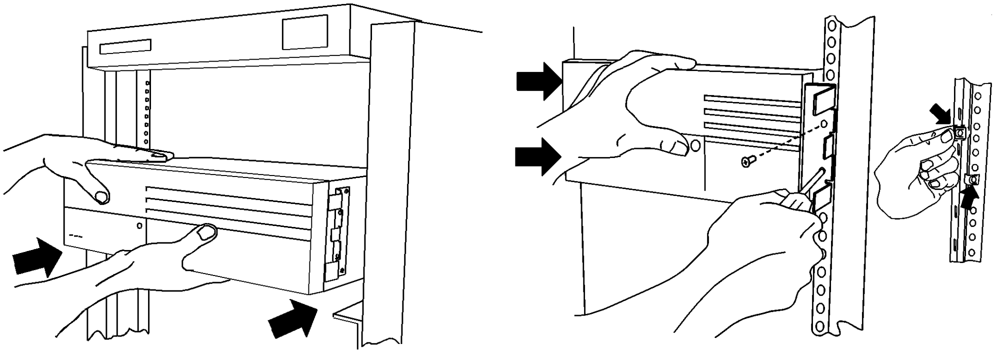
Note Place the SSB so the back panel is accessible and the cables can be easily attached.

Follow this procedure after unpacking the SSB and testing the unit. DO NOT connect any SCSI, FC, or power cables while installing the SSB into the cabinet.

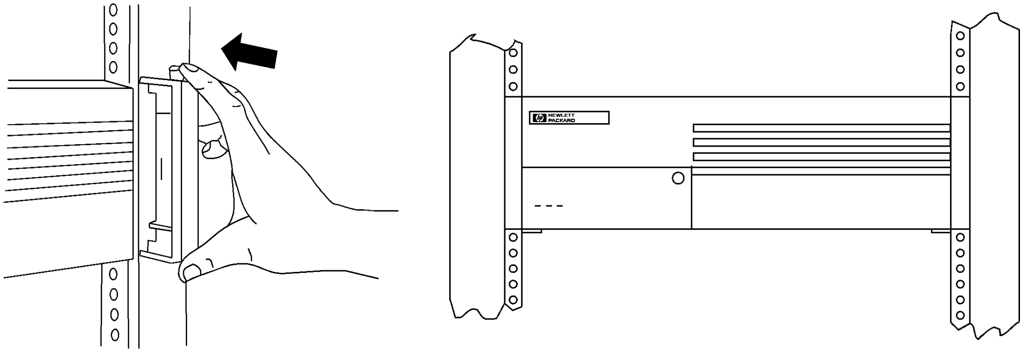
1. Select a secure location in the rack. The FC-SCSI Multiplexer requires four EIAs of space. Remove filler panels as necessary from the cabinet and open the rear cabinet door. Refer to cabinet documentation for specifics. Determine where the other equipment will be mounted.
2. Attach sheet metal nuts to the installation holes where each rail will be mounted. Insert the rail tabs into the cabinet column then add two screws into each rail to secure it to the column.



3. Attach each bracket to the SSB with two bracket screws. Attach two more sheet metal nuts per rail to the accessory hole of the of the column. Put the SSB on the rack and push it back until the ears make contact with the vertical columns before letting go. Put the screws in the brackets to secure them to the cabinet.



4. Attach the left and right end caps.

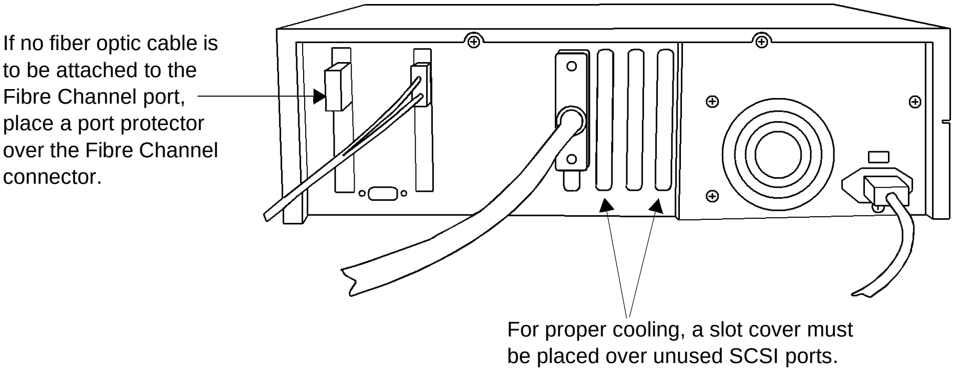


5. Plug the SSB power cord into the power distribution unit.
6. Reinstall any filler panels removed from the cabinet and close the door.

Connect the SCSI Devices to the SSB

Refer to the manual that came with the SCSI device for details on how to configure the device.

Refer to *Configuring HP-UX for Peripherals* (B2355-90053) for information on moving devices to a new address.



If no fiber optic cable is to be attached to the Fibre Channel port, place a port protector over the Fibre Channel connector.

For proper cooling, a slot cover must be placed over unused SCSI ports.

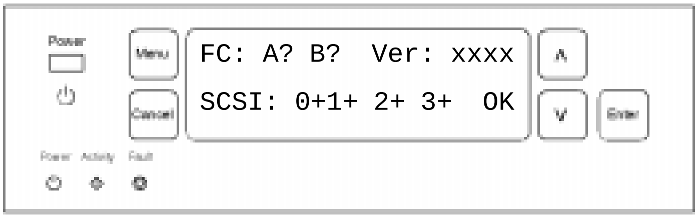
Figure 10 Cable and Power Cord Connections

1. Make sure all devices and the SSB are powered off.
2. Connect the device(s) to the SSB.

Test the SCSI Device Connections

Refer to the SSB Control Panel Quick Reference card (included with the SSB) for this procedure. A copy of the card is in the appendix.

1. Power on the SCSI devices. Refer to the documentation that came with the devices for power-on instructions.
2. Power on the SSB. After the self test, the SSB displays its status on the Slot Status Screen. If “OK” does not appear in the lower right corner, see chapter 5, Troubleshooting.



```
FC: A? B?  Ver: xxxx
SCSI: 0+1+ 2+ 3+  OK
```

The Quick Reference Card explaIns each field (see appendix).

Slot Status Screen

3. To view the status of SCSI adapters, press <**MENU**>. The SSB displays the Main Menu with its first option, the SSB Menu:

```
Main Menu
[SSB Menu]
```

4. Press ▼ to scroll through the adapters to the first SCSI adapter with attached devices. For example, if an adapter is installed in SCSI slot 0, the following appears:

```
Main Menu
[SCSI 0 Menu]
```

5. Press <ENTER> to display the Status Menu. Use the Status Menu to verify that the SSB senses attached devices. From the previous example, the LCD should show:

```
SCSI 0
[Status Menu]
```

6. Press <ENTER> to get a count of the devices attached to the selected SCSI adapter. The SSB searches for devices and displays the results on the LCD screen. For example, if devices are attached at targets 0, 1, 2, 3, 4, and 5 on SCSI 0, the LCD would show a device count of six, as follows:

```
SCSI 0: Status Menu
[Dev Count]: 6
```

Note If the device count is incorrect, see chapter 5, Troubleshooting, or contact an HP service representative.

7. Press ▼ to view the installed/uninstalled status of the first device. The device ID (Dev XX) corresponds to the physical address setting on the SCSI device. Continuing with the example from the previous step, the LCD would show:

```
SCSI 0: Status Menu
[Dev 00]: Installed
```

8. Press and verify that all attached SCSI devices are “installed.” See chapter 5, Troubleshooting, or contact an HP service representative as needed.

9. After checking the status of all devices, power off the devices.

10. Power off the SSB.

Connect the SSB to the Host FC Adapter

This step assumes that the verification steps at the beginning of this chapter have been completed. If the SSB has two FC adapters but only one is to be used, cover the fiber optic connectors on the unused adapter with the optical port protector or other cover.

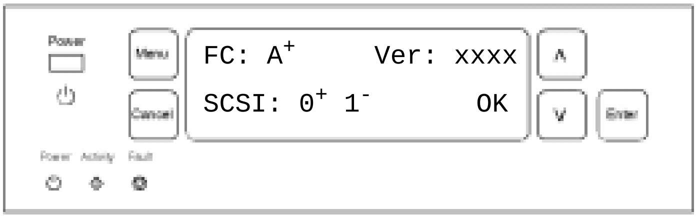
1. Power on the SCSI devices as described in the user documentation for the device.
2. Power on the SSB.
3. Connect the fiber optic cable between the host FC adapter and the SSB. The SSB and host can be active while you connect the fiber cable.

Note Be aware that fiber optic cables are breakable. They can be damaged and nonfunctional even though light passes through them.

Dirty connections also can interfere with the proper operation of fiber optic cables. To clean dirty cables, wipe them with a lint-free cloth treated with alcohol.

Check the SSB to Host Connections

1. Verify the SSB-host connection by viewing the various options on the FC Status Menu. See Using the FC Status Menu on page 75.
2. Select the State option on the FC Status Menu to view the status of the FC link. If the link is “up,” the SSB is connected and communicating with the host. If the link is “down,” the SSB is not communicating with the host even though the SSB may be connected and online.
3. To determine if the SSB is online, press <CANCEL> and view the Slot Status Screen. The following example shows that the SSB is online with the host:



```
FC: A+     Ver: xxxx
SCSI: 0+ 1-       OK
```

Example: FC A is online with the host; SCSI 0 is online, but SCSI 1 is offline.

   If the FC A or B is followed by the symbols “–” or “?”, the adapter is offline or in transition. See chapter 5, Troubleshooting, or contact the HP Support Center for help.

4. Use ioscan and insf to check the SSB hardware paths and verify the devices that were moved from the host to the SSB. Type the following commands one at a time on the host system:

```
ioscan -f
```

```
insf -e
```

   For more help, see Verifying the Hardware Path to the SSB and Attached Devices on page 54 and Interpreting ioscan Output on page 55.

5. Power on the device(s) as described in the device manual.

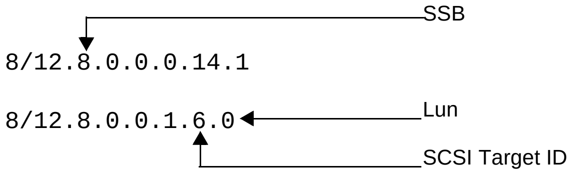
6. Power on or reboot the host as described in *HP-UX System Administration Tasks* (B2355-90079). The host recognizes the presence of the SSB in the boot process.
7. (Optional) Type **ioscan -fn** to display the device file names and paths along with the hardware connections.

The SSB is installed. If you moved SCSI disk drives from the host to the SSB earlier in this process, continue with the procedure on the next page. Otherwise, you may want to review chapter 3, Configuration, and verify hardware paths.

Relocating Logical Volumes

Follow the steps below to complete the process of relocating the SCSI disk drives. The first part of the process is detailed in Prepare the Tape Devices to be Moved (Optional) on page 33.

1. Import the volume group:
    - Type **sam**
    - Select Disks and File Systems
    - Select Volume Groups
    - Select the Actions menu
    - Select Import
2. Browse the volume groups listed in the Importable VGs list. Selecting an Importable VG number will display the hardware paths to the physical volumes in that Importable VG. For example, Importable VG 1 displays hardware paths:



```
8/12.8.0.0.0.14.1

8/12.8.0.0.1.6.0
```

This shows that a disk on SSB bus 0 with SCSI target ID 14, LUN 1 and a disk on SSB bus 1 with SCSI target ID 6, LUN 0 are used to make up this Importable VG. See Interpreting ioscan Output on page 55 for a more detailed analysis of the hardware path.

Having this information and the information gained in step 3 of Prepare the Disk Devices to be Moved (Optional) on page 34, plus knowing which SSB bus devices were moved, will help you find out which volume group is being imported.

3. Enter the new volume group name. (It is best to use the volume group name used previously.)
4. Enter the mapfile that was used in step 6 of Prepare the Disk Devices to be Moved (Optional) on page 34.
5. Select OK to complete the import.
6. To create a PVG:
   - Use the information from step 2 of Prepare the Disk Devices to be Moved (Optional) on page 34 to recreate the PVG.
   - Select the Actions menu
   - Select Create/Modify Physical Volume Groups
7. To mount the file system:
   - Select Disks and File Systems
   - Select File Systems
   - Select the Actions menu
   - Select Add Local File
   - Select Using the Logical Volume Manager

   Select the group/logical volumes to mount. (Use the information from step 2 of Prepare the Disk Devices to be Moved (Optional) on page 34 to determine what mount directory should be used for each volume group/logical volume.)

   Select the Modify File System Defaults option.

   Deselect the Create New File System in the Modify Defaults window. (This will prevent the existing file system from being destroyed.)

Logically Reconnecting Tape Libraries to the Host

Follow the steps below to complete the process of relocating the SCSI tape library. For the first part of the process, see Prepare the Disk Devices to be Moved (Optional) on page 34.

1. Log onto the system and install all special files for connected devices except the media changer (described in step 2 below).
   - Type **insf -e**
2. To determine the minor number and the driver name for the tape library device:
   - Type **ioscan -f**

   Depending on the device, the output will look similar to the following:

   ```
   Class      I   H/W Path          Driver    S/W State H/W Type   Description
   ext_bus    12  8/8.8.0.0.3       fcpmux    CLAIMED   INTERFACE  HP A3308
   autoch     0   8/8.8.0.0.3.6.0   schgr     CLAIMED   DEVICE     HP C1194F
   ```

   The minor number is composed of the following elements from the ioscan output:

   - The instance number (in the “I” column) in hex; in this example 12, which is **0c** in hex
   - The address of the target device; in this example, 6 from the H/W Path of the HP C1194F
   - The LUN of the target device; in this example, the last 0 from the H/W Path of the HP C1194F

   Combine the above elements in the form 0xIITL00, where “II” represents the instance number, “T” the target address, and “L” the LUN of the target device. Substituting the values from the above example, the minor number of the driver named “schgr” is 0x0c6000.
3. Determine the major number for the SCSI pass-through driver on the tape library.
   - Type **lsdev -d sctl**

The output will look similar to the following:

```
Character   Block   Driver   Class
203         -1      sctl     ctl
```

The major number is the number under the character field in the output, 203 in this example.

4. Make a new node for the tape library using the major number, minor number, and device type from the previous commands; in this example, type **mknod /dev/rmt/hpc1194f c 203 0x0c6000**.
5. Refer to chapter 3, Configuration, to verify hardware paths. If ioscan output shows the hardware paths of the SSB (the fcpdev driver) and of the devices connected to the SSB, the SSB is installed. See Interpreting ioscan Output on page 55 for an example of the correct output. If the ioscan output shows UNCLAIMED or NO-HW for the SSB or any of the devices connected to the SSB, refer to see chapter 5, Troubleshooting, or contact the HP Support Center for help.

3 CONFIGURATION

Configuring the SSB

This chapter explains how to verify that the SSB and attached SCSI peripherals are present to an HP system running HP-UX 10.20 or later.

The SSB functions as a pass-through device. With a default loop address of 0, the SSB requires no physical or logical settings, unless there is a duplicate hard address already on the loop.

Note If a duplicate hard address occurs, a soft address algorithm automatically generates and assigns a unique address. However, soft addressing can cause confusion with other devices when power fails.

Therefore, it is necessary to reset the SSB loop address using the FC Admin menu if address conflicts occur with other FC devices on a multinode loop (see Using the FC Admin Menu on page 79).

SCSI devices attached to the SSB may require configuration. See the appropriate device manual for configuration details. The SSB uses SCSI device ID 7.

For detailed information on how to install, verify, configure, or troubleshoot the Fibre Channel driver or adapter in the host, refer to your host operating system manual or *HP Fibre Channel Mass Storage Adapters Service and User Manual* (A3636-90002).

Verifying the Hardware Path to the SSB and Attached Devices

1. Type **ioscan -fn** to view the hardware path between the HSC FC adapter and attached SCSI devices including the SSB. Examine the output to determine if the SSB is present. For detailed examples of ioscan output, see Figure 12 through Figure 15.
2. Verify that all SCSI devices attached to the SSB are seen from the host by examining the ioscan output for each device (see Interpreting ioscan Output on page 55).
3. If the host does not show the hardware paths to the SSB, its devices, or targets, refer to chapter 5, Troubleshooting, for help.

Interpreting ioscan Output

There are two basic types of hardware paths to the SSB. They are paths for:

- The SSB control port
- Devices connected to the SSB

The SSB control port is the SSB itself, and is a means for the host to communicate directly to the SSB. The format of the hardware path to FC devices looks slightly different from the ioscan output for other types of devices. For a complete discussion of FC device addressing, see *HP Fibre Channel Mass Storage Adapter Service and User Manual* (A3636-90002).

Below is the format of the hardware path for SCSI devices attached to the host through the SSB.

```
Bus_Converter/Adapter_Address.Protocol_Type.Area.Port.Bus.Target.LUN
```

Table 2 Hardware Path Descriptions

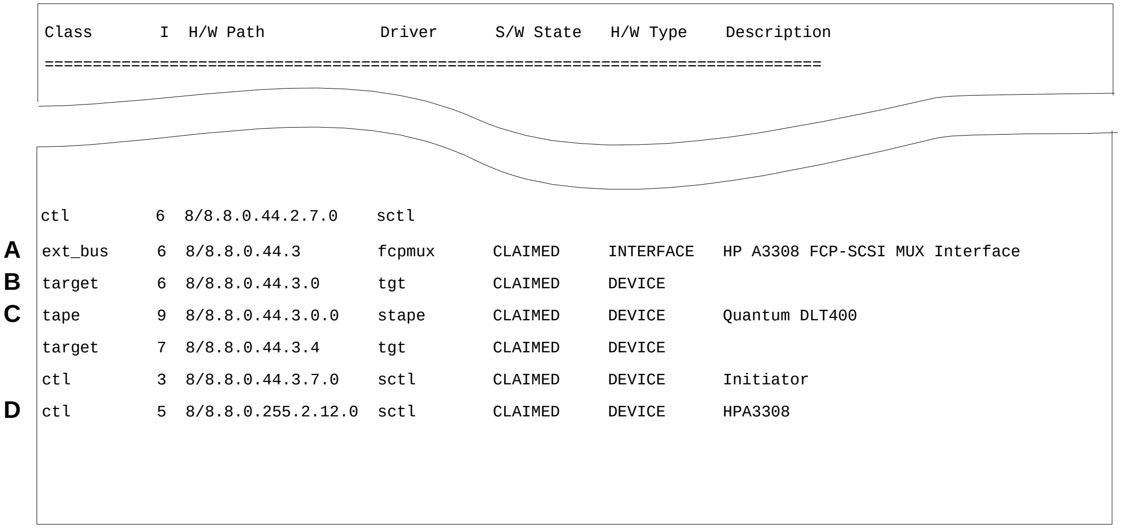
Field Name	Definition
Bus_Converter	Specification of one or more bus converters (each separated by a “/”) providing the connection from the host to the FC adapter.
Adapter_Address	Slot address of the FC adapter on the bus converter.
Protocol_Type	Protocol type “8” indicates Fibre Channel Protocol (FCP), the protocol type that allows SCSI commands and data to be transmitted across the Fibre Channel using standard frame and sequence formats.
Area	The area portion (2nd byte) of the N_Port Identifier. The value is always “0” for a private loop.
Port	For devices and LUNS attached to the SSB, this field is the port portion (3rd byte) of the N_Port Identifier (the FC adapter loop address in decimal). For the SSB control port (and all other directly connected FC devices), this value is 255.

Table 2 Hardware Path Descriptions (cont'd)

Field Name	**Definition**
Bus	For devices and LUNS attached to the SSB, this field is the first level of the SCSI FCP LUN identifier. The value corresponds to the SCSI adapter bus (0 to 3) in the SSB. For the SSB control port, this value is the top 4 bits of the port portion (3rd byte) of the N_Port Identifier.
Target	For devices and LUNS attached to the SSB, this field is the second level of SCSI FCP LUN identifier. The value is the address (0 to 15) of the device on the SCSI bus. For the SSB control port, this field is the lower 4 bits of the port portion (3rd byte) of the N_Port Identifier.
LUN	The LUN address (0-7) of the target device attached to the SSB. For the SSB control port, the LUN address is 0.

Lines A, B, C, and D in Figure 11 refer to the expanded output shown in Figure 12 through Figure 15.

Note ioscan may refer to the SSB as the FCP-SCSI MUX.



```
Class       I  H/W Path           Driver      S/W State   H/W Type    Description
=================================================================================

ctl         6  8/8.8.0.44.2.7.0    sctl
A ext_bus   6  8/8.8.0.44.3        fcpmux      CLAIMED     INTERFACE   HP A3308 FCP-SCSI MUX Interface
B target    6  8/8.8.0.44.3.0      tgt         CLAIMED     DEVICE
C tape      9  8/8.8.0.44.3.0.0    stape       CLAIMED     DEVICE      Quantum DLT400
  target    7  8/8.8.0.44.3.4      tgt         CLAIMED     DEVICE
  ctl       3  8/8.8.0.44.3.7.0    sctl        CLAIMED     DEVICE      Initiator
D ctl       5  8/8.8.0.255.2.12.0  sctl        CLAIMED     DEVICE      HPA3308
```

Figure 11 Overview: ioscan Path to SSB Device

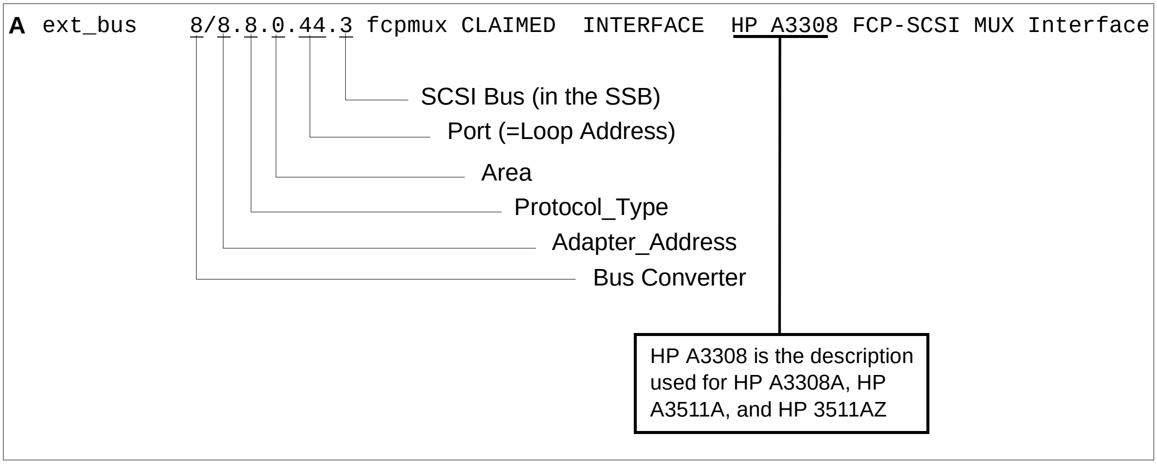
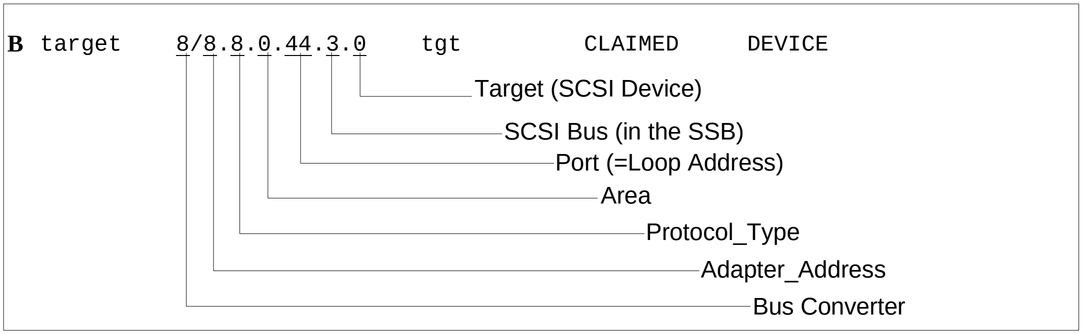
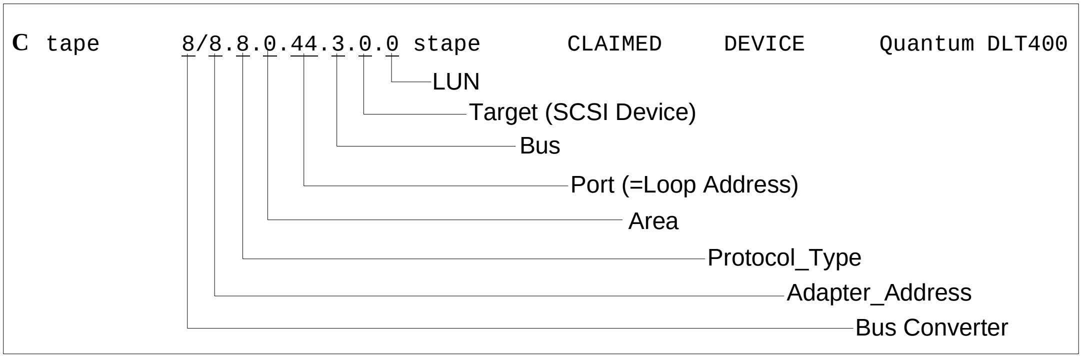

A ext_bus 8/8.8.0.44.3 fcpmux CLAIMED INTERFACE HP A3308 FCP-SCSI MUX Interface
SCSI Bus (in the SSB)
Port (=Loop Address)
Area
Protocol_Type
Adapter_Address
Bus Converter
HP A3308 is the description used for HP A3308A, HP A3511A, and HP 3511AZ

Figure 12 Example A: ioscan Path to SSB SCSI Bus



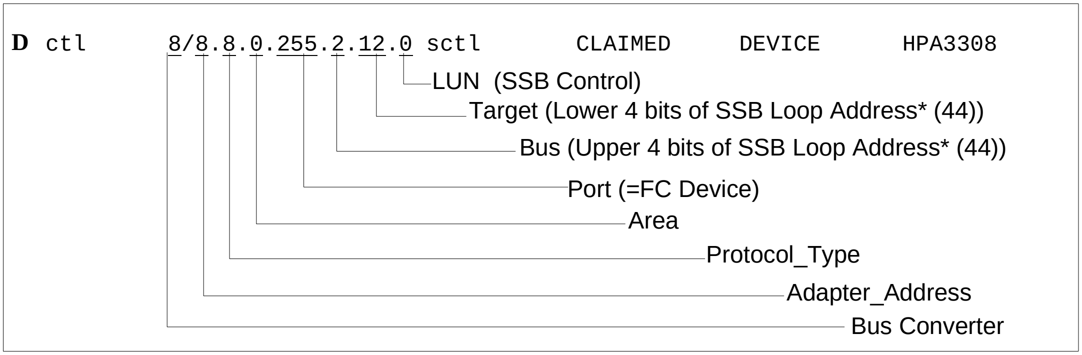
```
B  target    8/8.8.0.44.3.0    tgt         CLAIMED     DEVICE
```

Figure 13 Example B: ioscan Path to SCSI Device (Target)



```
C  tape      8/8.8.0.44.3.0.0 stape      CLAIMED     DEVICE      Quantum DLT400
```

Figure 14 Example C: ioscan Path to a LUN



```
D ctl      8/8.8.0.255.2.12.0 sctl       CLAIMED     DEVICE      HPA3308
```

LUN (SSB Control)
Target (Lower 4 bits of SSB Loop Address* (44))
Bus (Upper 4 bits of SSB Loop Address* (44))
Port (=FC Device)
Area
Protocol_Type
Adapter_Address
Bus Converter

*The Bus and Target values, 2 and 12, are derived from the Loop Address 44.

Figure 15 Example D: ioscan Path to the SSB Control Port

Interpreting the Hardware Path of the SSB Control Port

The SSB appears differently in the hardware paths of the devices connected to the SSB (Figure 14) than in the hardware path of the SSB itself (Figure 15) because they use different addressing methods. The SSB uses Peripheral Device Addressing whereas the devices attached to the SSB use Logical Unit Addressing. Peripheral Device Addressing and Logical Unit Addressing are part of the HP Fibre Channel Addressing strategy of creating multiple virtual SCSI buses in order to map the large FCP target address space onto the HP-UX parallel SCSI address model.

The unique value 255 in the port field of the SSB hardware path indicates Peripheral Device Addressing. The SSB control port uses the Peripheral Device Addressing method because all 16 values in the target and LUN fields of Logical Unit Addressing are needed to identify the devices that can be attached to the SSB. Peripheral Device Addressing divides the loop address of the SSB into the bus and target fields.

To understand how the bus and target fields of the SSB control port hardware path are derived from the SSB loop address:

1. Convert the decimal loop address to hex. For example, in the SCSI device path 8/8.8.0.44.3.0.0, 44 is the SSB loop address (port value). Decimal 44 converts to hex as follows:

   44 decimal = 2C hex

2. Separate the hex digits with a period, for example:

   2.C

3. Convert the separate hex digits to decimal as follows:

   2 hex = 2 decimal
   C hex = 12 decimal

   So that 2.C converted to decimal becomes 2.12, with 2 in the bus field and 12 in the target field, and the complete hardware path of the current example becomes 8/8.8.0.255.2.12.0.

4

USING THE CONTROL PANEL

Introduction

Control Panel Layout

LED Indicators

Powering on the SSB

Accessing the Main Menu

Using the SSB Status Menu

Using the FC Status Menu

Using the FC Admin Menu

Using the SCSI Status Menu

Using the SCSI Admin Menu

Viewing the Error Log

Error Code Descriptions

Error (ERR) Mode

Fatal Error Mode

Diagnostics Menu

Introduction

This chapter describes how to use the control panel to get status information (topology, address, number of devices connected to a SCSI bus, etc.), perform administrative tasks (set a loop address or reset an FC adapter), and test components in the SSB.

The SSB Control Panel Quick Reference, shown in the appendix, describes the menu structure.

Table 3 Control Panel Functions

Function	Description	Location
Self Test	Occurs every time the SSB is power cycled	Powering on the SSB on page 69
Slot Status Screen	Shows which adapters are installed in the SSB Shows which adapters are online, offline, or in transition	Powering on the SSB on page 69
Main Menu		
SSB Status	Shows SSB location Shows node name	Using the SSB Status Menu on page 71
SSB Admin	Sets SSB mode	Using the SSB Admin Menu on page 73
FC Status	Shows laser type (short wave) Shows SSB source ID Shows speed of FC Shows state of the FC link Shows topology being used Shows loop address Shows node and port names	Using the FC Status Menu on page 75
FC Admin	Sets a loop address Resets the FC adapter	Using the FC Admin Menu on page 79
SCSI Status	Shows total number of devices on each bus Shows whether a device is installed	Using the SCSI Status Menu on page 82

Table 3 Control Panel Functions (cont'd)

Function	Description	Location
SCSI Admin	Resets a SCSI bus Takes a SCSI bus offline Returns a SCSI bus online	Using the SCSI Admin Menu on page 84
Error Log	Displays the error log Displays the error message for each log	Viewing the Error Log on page 89
Diagnostics (Takes SSB Offline)	Control Button Test (control buttons on front panel) FC External Loopback Test (requires a loopback cable, HP part 1005-0624, attached to the FC adapter's external connector) FC Internal Loopback Test LCD Test LED Test (front and rear panel LEDs) Memoryboard Test Motherboard Test SSB Self Test SCSI Internal Loopback Test	About the SSB Diagnostics Menu on page 104

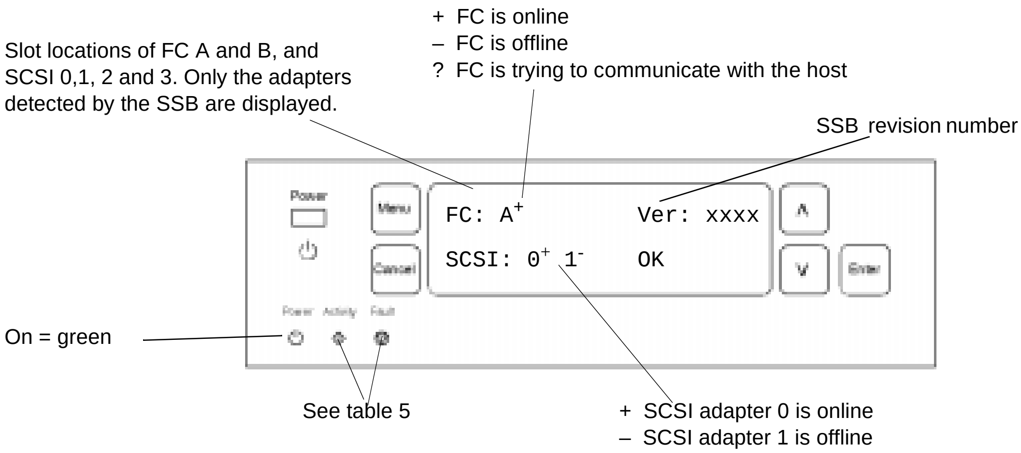
Note The SSB remains in Diagnostics mode until you select <CANCEL> to return online. In any other menu state, the SSB LCD returns to the Slot Status Screen after two minutes of no user activity.

Use the SCSI Admin Menu only for troubleshooting, but only *after* making sure that all activity on the target bus has ceased.

Table 4 Screen Conventions used in the LCD

Convention	Description
A B	The slot locations of FC A and B. The FC ID is the slot location. The only possible IDs are A and B.
0 1 2 3	The SCSI adapter slot numbers. The SCSI ID in the context of the SSB is the slot location. The four possible slot IDs are 0, 1, 2, and 3. For example, SCSI 1 is the SCSI adapter in slot 1.
+	(Next to the adapter ID) The identified adapter is online.
-	(Next to the adapter ID) The identified adapter is offline.
?	(Next to the A or B) The FC is not completely online but is trying to communicate with the host.
[ ] [ ]:	There are options below this level. Pressing ▼ or ▲ scrolls to the next option. Precedes a value or selection.
Ver: xxxx	The version number of the SSB firmware.

Control Panel Layout



Slot locations of FC A and B, and SCSI 0,1, 2 and 3. Only the adapters detected by the SSB are displayed.

+ FC is online
– FC is offline
? FC is trying to communicate with the host

SSB revision number

On = green

See table 5

+ SCSI adapter 0 is online
– SCSI adapter 1 is offline

Figure 16 Slot Status Screen Example

Using the Control Panel

Use the control panel buttons to navigate through the Main Menu and control SSB functions. See the SSB Control Panel Quick Reference (see appendix) for additional information.

Power ☐	– Power-cycles the SSB and initiates SSB self test.
Menu	– Displays the Main Menu.
^ **v**	– Scrolls up or down.
Enter	– Selects a menu or option, or performs a task.
Cancel	– Cancels a selection and returns to the previous screen.

LED Indicators

Table 5 Front Panel LED Indicators

Power **ON = green**	**Activity** **ON = blinking**	**Fault** **ON = amber**	**Description**
OFF	OFF	OFF	No power to the SSB; the SSB could be powered off, or the power supply or power supply cable is faulty.
ON	ON	ON	The SSB is powering on.
ON	OFF	OFF	The SSB is self testing.
ON	*	OFF	Normal active state: A blinking activity light means that activity is occurring.
ON	*	ON	If the Fault LED stays on more than 60 seconds, a fault has occurred. The SSB logs the error and goes into Error or Fatal mode.
ON	OFF	blinking	The SSB is offline if the front panel Fault LED is blinking and the Install LEDs for all installed adapters are blinking. This is the Diagnostics Mode.

* = OFF, ON, or blinking

Note If the Fault LED on the front panel and the Fault LEDs on the rear panel remain on, contact an HP service representative.

Table 6 Rear Panel Indicators

Power ON = green	**Activity** ON = blinking	**Fault** ON = amber	**Indication**
ON	ON	ON	If all 18 LEDs remain on after the SSB powers up, the power supply or motherboard is faulty.
ON	OFF	ON	The FC or SCSI adapter with the Fault LED on is faulty or the wrong serial cable may be attached.
OFF	OFF	ON	The SSB does not recognize the adapter in the slot corresponding to the lit LED. For example, an FC adapter may be in one of the SCSI slots.
OFF	OFF	OFF	The SSB does not recognize the adapter in the slot. No adapter is installed, the adapter is faulty, or the wrong adapter is installed.
blinking	OFF	OFF	The adapter associated with the blinking LED is offline. Only SCSI bus adapters can be placed offline individually.
all 6 blinking	OFF	OFF	The SSB is offline if all 6 Install LEDs are blinking, and the front panel Fault LED is blinking.

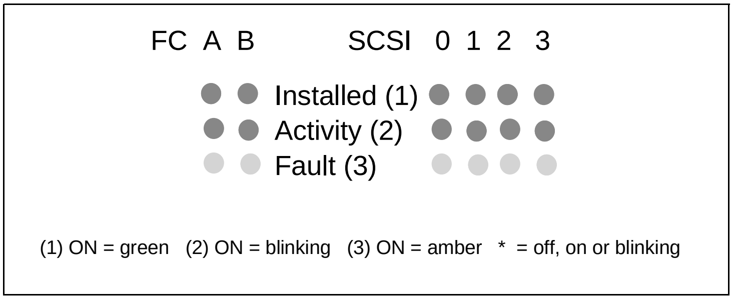

FC A B
SCSI 0 1 2 3
Installed (1)
Activity (2)
Fault (3)
(1) ON = green (2) ON = blinking (3) ON = amber * = off, on or blinking

Figure 17 Rear Panel LED Placement

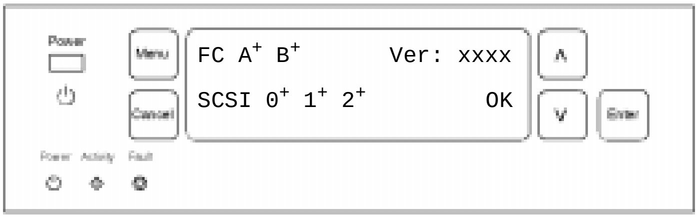
Powering on the SSB

1. Press <**POWER**>. The self test begins and a series of numbers flash across the LCD. The names of individual components display as they are tested:

```
Self testing...
{the component being tested}
```

2. The self test results display.

If the SSB passes the self test, the Slot Status Screen appears. For example, the SSB may show the following:



```
FC A+ B+        Ver: xxxx
SCSI 0+ 1+ 2+          OK
```

If the Slot Status Screen displays “OK,” the SSB passed its self test. If the message “ERR” or “Fatal Error” displays, an error occurred. For more information, see the following sections in this chapter:

- Control Panel Layout on page 65
- Viewing the Error Log on page 89
- Error (ERR) Mode on page 93
- Fatal Error Mode on page 94

For more information, see chapter 5, Troubleshooting.

Accessing the Main Menu

Use this procedure to access the Main Menu for the installed FC or SCSI adapters.

1. Press <**MENU**> to display the Main Menu or <**CANCEL**> from any submenu until the Main Menu displays.

   The screen shows the FC adapter as the second choice of the Main Menu. For example, the LCD may display:

   ```
   Main Menu
   [FC A Menu]
   ```

   If the FC A adapter is not installed, “[FC A Not inst.]” will appear.

2. Press ▼ or ▲ to display a different FC or SCSI adapter menu. Press <**ENTER**> to select the desired FC or SCSI adapter menu and display its submenu. Refer to the SSB Control Panel Quick Reference (see appendix) for menu options.

3. To back out of the Main Menu and display the Slot Status Screen, press <**CANCEL**>.

Using the SSB Status Menu

Use the SSB Status Menu to view the following:

- SSB Location
- Node Name
- SSb Mode

To view the SSB Location, Node Name, and SSB Mode, do the following:

1. Press < **MENU**> to display the Main Menu. To return to the Main Menu at any time, press <**MENU**>, or press <**CANCEL**> from any submenu until the Main Menu appears.
2. The SSB Menu will appear first.

```
Main Menu
[SSB Menu]
```

3. Press <**ENTER**> to select SSB Status Menu.

```
SSB Menu
[Status Menu]
```

4. Press <**ENTER**> to select View SSB Location.

```
SSB: Status Menu
[View SSB Location]
```

5. Press <**ENTER**> to display the SSB Location.

```
View SSB Location
WWN:20000060b02a127a
```

6. To exit this screen, press <**CANCEL**>. The display returns to the previous option; for example:

```
SSB: Status Menu
[View SSB Location]
```

7. Press ▼ to scroll to the next option on the SSB Status Menu; for example:

```
SSB: Status Menu
[View Node Name]
```

8. Press <ENTER> to display the Node Name.

```
View Node Name
0x20000060b02a127a
```

9. To return to the Main Menu, press <MENU>.

Using the SSB Admin Menu

Use the SSB Admin Menu to set SSB Mode. Follow the steps below.

Before setting the SSB Mode, be sure to read the mode definitions on page page 74 to prevent any data corruption or loss.

1. Press <**MENU**> to display the Main Menu. To return to the Main Menu at any time, press <**MENU**> or <**CANCEL**> from any submenu until the Main Menu appears.

   ```
   Main Menu
   [SSB Menu]
   ```

2. Press <**ENTER**> to select the SSB Status Menu.

   ```
   SSB Menu
   [Status Menu]
   ```

3. Press ▼ to scroll to the SSB Admin Menu.

   ```
   SSB Menu
   [Admin Menu]
   ```

4. Press <**ENTER**> to select Set SSB Mode.

   ```
   SSB: Admin Menu
   [Set SSB Mode]
   ```

5. Press <**ENTER**> to display the Set SSB Mode options menu.

   ```
   Set SSB Mode
   [SPLIT]
   ```

6. Press ▼▲ to select the desired mode, then press <**ENTER**>. The LCD prompts for confirmation; for example:

   ```
   Set SSB Mode to
   SPLIT? [No]
   ```

7. Press ▼ to scroll to [Yes], then press <ENTER> to set the SSB Mode. (Or press <CANCEL> if you do not want to set the SSB Mode.)

   ```
   Set SSB Mode SPLIT COMPLETE
   ```

Changes to the operating mode can be done at any time and take effect immediately. Mode status is stored in non-volatile storage and remains in effect until changed again.

Mode Definitions

Normal

This is the default mode of operation and is equivalent to the mode of operation for the SSB for firmware releases 3840 and prior.

Split

The Fibre Channel ports are associated with specific SCSI ports. FC A has access to SCSI 0 and SCSI 1. FC B has access to SCSI 2 and SCSI 3. FC A does not have access to SCSI 2 or SCSI 3 and will not see or be able to perform any I/O operation to devices on those buses. The same is true for FC B and SCSI 0 and SCSI 1. The SSB is split into a pair of SSBs. No I/O can be performed through a bridge that is configured without an FC card and at least one SCSI card on the same side of the split.

Intended Use

In environments with multiple hosts and devices, split mode can be used to prevent unintended access to non-shared devices. An example of this would be two hosts using bridges to access tape libraries. Each host has tape mechanisms dedicated to it and is prevented from accessing the other’s tapes by enabling split mode.

The SSB is not internally redundant. Therefore, split mode must not be used to cover both paths in a High Availability solution. Separate SSBs must be used in the primary and fail-over paths in the system.

Because the choice of operating mode is a manual procedure, and can affect a system’s configuration, it is recommended that changing the SSB mode while it is operating should only be performed as part of an exception process.

Using the FC Status Menu

Use the FC Status Menu to view the following information about the FC function of the SSB:

- Laser type
- SSB Source ID
- Speed of the link
- State of the link
- Topology
- Loop Address
- Node name
- Port name

Table 7 details these options. Follow the steps below to access each option.

1. Press <MENU> to display the Main Menu. To return to the Main Menu at any time, press <MENU>, or press <CANCEL> from any submenu until the Main Menu appears; for example:

   ```
   Main Menu
   [SSB Menu]
   ```

2. Press ▼ until the desired FC adapter appears; for example:

   ```
   Main Menu
   [FC B Menu]
   ```

3. Press <ENTER> to display the FC Status Menu. (The other option is the Admin Menu.)

   FC B Menu
   [Status Menu]

4. Press <ENTER> to display the first status item; for example:

   ```
   FC B: Status Menu
   [Laser Type]: SW
   ```

5. Press ▼ to scroll to the next option. The LCD displays the SSB Source ID; for example:

   ```
   FC B: Status Menu
   [SSB Source ID]: 67
   ```

6. Press ▼ to scroll to the next option. The LCD displays the speed of the FC adapter; for example:

   FC B: Status Menu
   [Speed]: 1063 Mbps

7. Press ▼ to scroll to the next option. The LCD displays the status of the FC link; for example:

   FC B: Status Menu
   [State]: LINK UP

   Press ▼ to scroll to the next option. The LCD displays the topology used by the SSB and host; for example:

   ```
   FC B: Status Menu
   [Topology]: LOOP
   ```

8. Press ▼ to scroll to the next option. The LCD displays the View Loop Address option:

   FC B: Status Menu
   [View Loop Address]

9. Press <ENTER> to view the Loop Address of the selected FC adapter. The LCD displays two addresses; for example:

   FC B: Loop Address
   Set: 044 Using: 044

The “Set” address was entered by an operator using Set Loop Address on the FC Admin Menu. A different “Using” address indicates that the “Set” address conflicted with another node on the loop and the system substituted a self-generated unique address.Values will be “N/A” if the topology is not loop.

Note Letting the system automatically set the loop address is not desirable.

10. Press <CANCEL>, <ENTER>, ▼, or ▲. The LCD returns to the previous menu option:

    ```
    FC B: Status Menu
    [View Loop Address]
    ```

11. Press ▼ to scroll to the next option. The LCD displays the option to view the Node Name:

```
FC B: Status Menu
[View Node Name]
```

12. Press <ENTER> to view the Node Name. The LCD displays the 64-bit node name used by the SSB and host; for example:

```
FC B: Node Name
0x0900000000000000
```

13. Press <CANCEL> or <ENTER>. The LCD returns to the previous menu option:

```
FC B: Status Menu
[View Node Name]
```

14. Press ▼ to scroll to the next option.

```
FC B: Status Menu
[View Port Name]
```

15. Press <ENTER>. The LCD displays the 64-bit port name; for example:

```
FC B: Port Name
0x0901000000000000
```

16. To return to the FC Status Menu, press <CANCEL> or <ENTER>.

Table 7 FC Status Menu Descriptions

Status	**Description**
Laser type	Must be short wave (SW).
SSB Source ID	The identification of the SSB sending/transmitting data to the host. The ID will be invalid if the topology is point-to-point or an unrecognized topology.
Speed	The speed of the FC adapter
State	LINK UP means the host and SSB connection is okay. LINK DOWN means the host and SSB connection is inactive; there is no communication between the SSB and host. It could also mean the SSB is in transition; that is, the SSB is attempting to contact the host, but the host may be down.
Topology	The type of protocol being used
View loop address	The address of the FC adapter in loop topology. Up to 126 devices, addressed from 0 to 125, can be connected in a loop.
View node name	The unique identifier, a 64-bit value the factory assigns to the SSB
View port name	The FC port identifier, a 64-bit value that relates to the node name of the SSB

Using the FC Admin Menu

Use this menu to set the loop address and/or reset an FC adapter. Resetting an FC adapter terminates all inputs/outputs through the Fibre Channel connection. The other FC adapter is not affected.

Follow the steps below to set the loop address and reset the FC adapter.

1. Press <MENU> to display the Main Menu, or press <CANCEL> from a submenu until the Main Menu appears. For example, the LCD displays the following:

   ```
   Main Menu
   [SSB Menu]
   ```

2. Press ▼ to select FC A:

   Main Menu
   [FC A Menu]

   The following examples assume you are looking at the FC A Menu.

3. Press <ENTER> to display the Status Menu.

   FC A Menu
   [Status Menu]

4. Press ▼ to scroll to the Admin Menu; for example:

   FC A Menu
   [Admin Menu]

5. Press <ENTER> to display the FC A Admin Menu and its first option; for example:

   ```
   FC A: Admin Menu
   [Set Loop Address]
   ```

6. Press <ENTER> to display the FC A Loop Address menu and its first option; for example:

   ```
   FC A: Loop Address
   [000]
   ```

7. Press ▼ until the desired address displays; for example:

```
FC A: Loop Address
[044]
```

8. Press <Enter> to set the FC adapter to the selected address. The LCD prompts for confirmation; for example:

```
Set Loop Addr to 44
& reset FC A? [No]
```

Caution As with any reset, all pending inputs and outputs will be deleted. If you do NOT want to reset the adapter, press <Cancel>.

9. If you are sure you want to set the FC adapter to the selected address, press ▼ to scroll to Yes, then press <Enter>. Press <Cancel> if you do not want to set the loop address.

10. When the address is set, the screen displays:

```
Set Address for FC A
COMPLETE
```

11. To exit this screen, press <Cancel>. The display steps back to the selected option; for example:

```
FC A: Admin Menu
[Set Loop Address]
```

12. Press ▼ to scroll to the next option on the Admin Menu:

```
FC A: Admin Menu
[Reset FC Adapter]
```

13. Press <Enter> to reset the adapter. The LCD prompts for confirmation; for example:

```
Reset FC Adapter A
now? [no]
```

See the caution in step 8 (above).

14. If you are sure you want to reset the adapter, press ▼ to select Yes and <Enter>. Press <Cancel> if you do not want to reset the adapter.

15. When the reset is done, the screen displays:

```
Reset of FC A
COMPLETED
```

16. To exit this screen, press <**CANCEL**>. The display steps back to the selected option; for example:

    FC A: Admin Menu
    [Reset FC Adapter]

17. To return to the Main Menu, press <**MENU**>.

Using the SCSI Status Menu

Use this menu to view the following:

- The number of devices connected to a SCSI adapter (Dev Count)
- The installed or uninstalled device status of a SCSI adapter (Dev xx: installed or not installed)

“Dev xx” identifies a particular device on a SCSI adapter and equals the SCSI address set on the device. Each SCSI adapter can be connected to as many as 15 devices with addresses 0 through 6 and 8 through 15. The SCSI Status Menu shows the devices in ascending order (0, 1, 2, 3, etc.), not the order in which they were attached to the bus or the SCSI-ranked order (7, 6 to 0, then 15 to 8).

The SSB always reflects the current status. For example, if you detach the cable of a device and re-enter the Status Menu, the device count and status are changed.

Follow the steps below to view the total number and individual status of SCSI devices connected to the SSB. For other SCSI status information, such as whether the SCSI adapter is online or offline, consult the Slot Status Screen.

1. Press <MENU> to display the Main Menu, or press <CANCEL> from any submenu until the Main Menu appears. For example, the LCD displays:

   ```
   Main Menu
   [SSB Menu]
   ```

2. Press ▼ until the desired SCSI adapter appears. In the following example, SSB, FC A, FC B, SCSI 0, and SCSI 1 were passed in order to select SCSI 2:

   ```
   Main Menu
   [SCSI 2 Menu]
   ```

3. Press <ENTER> to display the Status Menu for the selected adapter. For example, the display shows:

   ```
   SCSI 2
   [Status Menu]
   ```

4. Press <ENTER> to access the Status Menu. The first option shows the number of devices connected to the selected SCSI adapter. In this example, ten devices are connected to SCSI 2:

```
SCSI 2: Status Menu
[Dev Count]: 10
```

5. Press ▼ to display the device status at the first address on the selected SCSI adapter. The following example shows no physical device is connected or installed at address 0 on SCSI 2:

   SCSI 2: Status Menu
   [Dev 00]: Not inst.

6. To view the installed or uninstalled device status at the next address on the selected SCSI adapter, press ▼ again.
7. To return to the SCSI x (0, 1, 2, or 3) Status Menu, press <CANCEL>.

Using the SCSI Admin Menu

Use the SCSI Admin Menu to take a SCSI adapter offline, reset a SCSI adapter (resets the SCSI adapter as well as all devices connected to the adapter), or other administrative task.

1. Press <MENU> to display the Main Menu, or press <CANCEL> from any submenu until the Main Menu appears. For example, the LCD displays:

   ```
   Main Menu
   [SSB Menu]
   ```

2. Press ▼ until the desired SCSI adapter appears. The SSB displays the message “Not Inst” if no adapter is installed in the slot. In the following example, FC A, FC B, SCSI 0, and SCSI 1 were passed to display SCSI 2:

   ```
   Main Menu
   [SCSI 2 Menu]
   ```

3. Press <ENTER> to access the menu of the selected SCSI adapter. The Status Menu is the first option. The following example shows the SCSI 2 Menu, Status Menu:

   ```
   SCSI 2
   [Status Menu]
   ```

4. Press ▼ to scroll to the Admin Menu; for example:

   ```
   SCSI 2
   [Admin Menu]
   ```

5. Press <ENTER> to display the SCSI Admin Menu.

Table 8 SCSI Administrative Task Descriptions

Task	Description
Reset Bus	Resets a specific adapter (bus) and returns the devices online (see To Reset a SCSI Bus (Reset the Adapter)).
Take Offline	Resets an adapter and makes devices unavailable for input/output. All transactions going to the connected devices time out (see To Take a SCSI Adapter Offline on page 86).
Go Online	Makes an adapter (bus) available for input/output (see To Return the SCSI Adapter Online on page 87).

To Reset a SCSI Bus (Reset the Adapter)

The following procedure explains how to reset all devices connected to the selected SCSI adapter. (Also see Using the FC Status Menu on page 75.)

Before resetting the SCSI adapter, use SAM or another system administrative procedure to halt activity between the host and the devices attached to the adapter. All devices will reset when the adapter is reset. To reset a specific device, see To Take a SCSI Adapter Offline on page 86.

1. Press <MENU> to display the Main Menu, or <CANCEL> from any submenu until the Main Menu appears.
2. Display the SCSI Admin Menu. To access this menu, see Using the SCSI Admin Menu on page 84.
3. Press ▼ to scroll to the Reset Bus option. The following example shows the Reset Bus option in the Admin Menu for the SCSI adapter in slot 2:

   ```
   SCSI 2: Admin Menu
   [Reset Bus]
   ```

4. Press <ENTER> to reset the SCSI adapter and all devices on the bus. The following message prompts for confirmation:

   ```
   Reset entire bus on
   SCSI 2 now? [No]
   ```

5. Press ▼ to scroll to Yes and press <ENTER>. (Press <CANCEL> if you do not want to reset the adapter.)
6. The SSB resets the SCSI adapter and its devices. A message indicates the action is complete.

   ```
   Reset of the SCSI 2
   COMPLETE
   ```

7. Press <CANCEL> to return to the SCSI x Admin Menu, Reset Bus option.

To Take a SCSI Adapter Offline

The following procedure explains how to take a SCSI adapter and all devices connected to the adapter offline.

Note Before taking a SCSI adapter offline, make sure that all activity on the target bus has terminated.

1. Press <MENU> to display the Main Menu, or <CANCEL> from any submenu until the Main Menu appears.
2. Display the SCSI Status Menu. To access this menu, see Using the SCSI Admin Menu on page 84.
3. Press ▼ to scroll to the Take Offline option. The following example shows the Take Offline option in the Admin Menu for the SCSI adapter in slot 2.

   SCSI 2: Admin Menu
   [Take offline]

4. Press <ENTER> to take the SCSI adapter and all devices connected to the adapter offline. A message prompts for confirmation; for example:

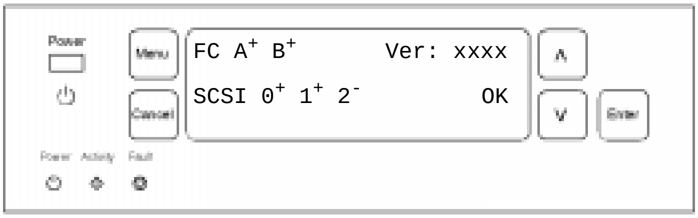
   ```
   Take SCSI bus 2
   offline now? [No]
   ```

5. Press ▼ to scroll to “Yes” and press <ENTER>. Press <CANCEL> if you do not want to take the adapter offline.

6. The SSB takes the SCSI adapter offline. A message indicates the SCSI bus is offline as follows:

   ```
   SCSI 2
   is OFFLINE
   ```

   The SCSI bus stays offline until you place it back online. To verify that the SCSI bus is offline, display the Slot Status Screen and look for the symbol “-” next to the SCSI adapter number. The symbol “+” means that the bus did not go offline. In that case, refer to chapter 5, Troubleshooting, or contact an HP Service Representative.



FC A^{+} B^{+} Ver: xxxx
SCSI 0^{+} 1^{+} 2^{-} OK

To Return the SCSI Adapter Online

This instruction assumes the adapter is offline and you are viewing the message “SCSI X is OFFLINE.” If a different screen is displayed, return to the SCSI Admin Menu, Take Offline option.

1. Press <CANCEL>. The following option appears:

   SCSI 2: Admin Menu
   [Go online]

2. Press <ENTER> to put the selected SCSI adapter and connected devices back online. A confirmation message appears:

   Go online with SCSI
   bus 2 now? [No]

3. Press ▼ to scroll to Yes and press <ENTER>. Press <CANCEL> if you do not want to put the adapter online.

4. Press <MENU> to return to the Main Menu.
5. Verify that the SCSI bus is online by inspecting the Slot Status Screen. The symbol “+” next to the adapter number means that the adapter is online. If the symbol “-” displays, the bus did not go online. Refer to chapter 5, Troubleshooting, or contact an HP service representative.

Viewing the Error Log

Whenever the SSB senses an error condition, it logs the error. Errors are tracked by the Error Log and can be retrieved using the Support Tools Manager (STM) software program. For more information on STM, see Using Support Tools Manager (STM) on page 108. The following information describes how to display and interpret Error Log information.

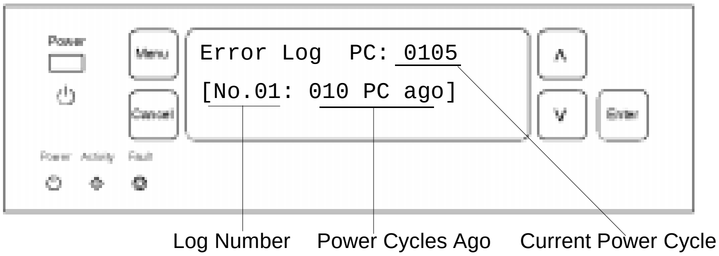
1. Press <**MENU**> to display the Main Menu, or press <**CANCEL**> from any other submenu until the Main Menu appears; for example:

```
Main Menu
[SSB Status SSB]
```

2. From the top SSB submenu, press ▲ twice to display the Error Log submenu:

```
Main Menu
[Error Log]
```

3. Press <**ENTER**> to view the first Error Log.



```
Error Log  PC: 0105
[No.01: 010 PC ago]
```

Press <**ENTER**> to see the Error Message Detail screen.

Figure 18 Example Error Log

Interpret the Error Log screen as follows:

Error Log PC

The number of times the SSB has been power cycled. The SSB associates the power cycle number with the error log number for tracking purposes. As Figure 18 shows, the SSB has tracked 105 power cycles.

Log Number

The SSB tracks up to ten errors, with the first (number 01) as the newest error and the tenth as the oldest error. Each time a new error occurs, it becomes number 01 and the error previously logged as number 01 becomes number 02. The error previously logged as number 10 is deleted from the log.

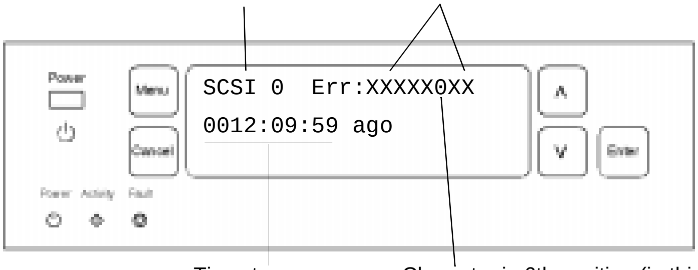
Power Cycles Ago

The number of times the SSB has been power cycled since the error was logged. For example, if the SSB had 105 power cycles and error log number 01 occurred on the 95th power cycle, then Error Log number 01 occurred ten power cycles ago. When the Error Log power cycle number is the same as the current power cycle number, the SSB displays the message “Current PC” instead of “PC Ago.”

4. Press <ENTER> to view a detailed error message (Figure 19).

Location of the error

Manufacturing use only



```
SCSI 0  Err:XXXXX0XX
0012:09:59 ago
```

Timestamp

Character in 6th position (in this case, 0) is the Error Code.

Figure 19 Example Error Message Detail Screen

The Error Message Detail screen is interpreted as follows:

Location of the Error

The physical component where the fault occurred in the SSB. As Figure 19 shows, the fault occurred at the SCSI adapter in slot 0.

Note To confirm whether the component identified as the location of the error is accurate, conduct additional tests using the Diagnostics Menu from the SSB front panel. (Make sure you are not researching an error that has already been corrected but is still in the Error Log.)

Error code

As Figure 19 shows, the error code is 0, indicating failure of the SCSI adapter. Table 9 on page 92 describes the error codes.

Timestamp

The total number of days, hours, and minutes the SSB has been operating. Use this timestamp to identify how many days, hours, and minutes ago the error occurred. As Figure 19 shows, the error occurred 12 days, 9 hours, and 59 minutes ago.

Error Code Descriptions

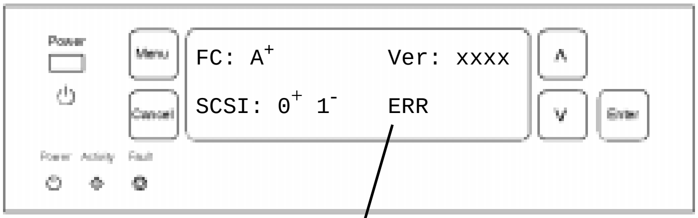
Table 9 Error Locations and Error Code Descriptions

Error Location	Error Code	Description/Action
Fan	XXXXX**F**XX	Fan failed. Replace fan assembly. See Replacing the Fans – HP Qualified Personnel Only on page 147 (chapter 6).
FC A	XXXXX**A**XX	Adapter FC A failed. Replace FC A. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
FC B	XXXXX**B**XX	Adapter FC B failed. Replace FC B. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
LCD	XXXXX**8**XX	LCD failed. See Replacing the LCD – HP Qualified Personnel Only on page 150.
M_BRD	XXXXX**6**XX	See Replacing the Motherboard – HP Qualified Personnel Only on page 154.
MEM	XXXXX**7**XX	Memoryboard failed. Replace the Memoryboard. See Replacing a Memory Card – HP Qualified Personnel Only on page 145.
SCSI 0	XXXXX**0**XX	SCSI Adapter 0 failed. Replace SCSI 0. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
SCSI 1	XXXXX**1**XX	SCSI Adapter 1 failed. Replace SCSI 1. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
SCSI 2	XXXXX**2**XX	SCSI Adapter 2 failed. Replace SCSI 2. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
SCSI 3	XXXXX**3**XX	SCSI Adapter 3 failed. Replace SCSI 3. See Adding, Removing, or Replacing a SCSI Adapter on page 142.
UNKNWN	XXXXX**5**XX	Location of the failure is unknown. Contact the HP Support Center.
	XXXXX**9**XX	Location of the failure is unknown. Contact the HP Support Center.
	XXXXX**C**XX	Location of the failure is unknown. Contact the HP Support Center.
	XXXXX**D**XX	Location of the failure is unknown. Contact the HP Support Center.
	XXXXX**E**XX	Location of the failure is unknown. Contact the HP Support Center.

Error (ERR) Mode

If the SSB senses an internal error during its normal functions, it logs the error to an internal error log. In Error mode, the SSB cannot process data but can communicate with the host, and the SSB diagnostics can be run. If the SSB goes into a Fatal mode, it shuts down. See Fatal Error Mode on page 94 for more information.

The Error Log lists the error. For more information on error logs and error codes, see Viewing the Error Log on page 89.



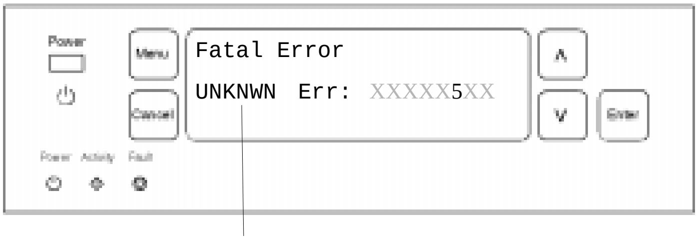
```
FC: A+          Ver: xxxx
SCSI: 0+ 1-     ERR
```

Indicates the SSB is in error mode and only partially functional. No data is processed, but the Diagnostics menu is still available.

Figure 20 Example Error Mode Display

Fatal Error Mode

The SSB goes into a Fatal Error mode if it senses a serious internal error. In this mode, the SSB logs one error to its internal log before it shuts down. Contact an HP service representative to assist with troubleshooting the SSB.



```
Fatal Error
UNKNWN  Err: XXXXX5XX
```

Indicates the approximate location of the faulty component. All SSB functions are shut down.

Figure 21 Example of a Fatal Error Visible from the Slot Status Screen

Note If UNKNWN displays, the location of the error in the SSB is unknown. Only one fatal error will display before the SSB shuts down.

Diagnostics Menu

See About the SSB Diagnostics Menu on page 104.

5 TROUBLESHOOTING

Troubleshooting Strategies

Observing the Symptoms

About the SSB Diagnostics Menu

Using the Diagnostics Menu

Returning Online

Using Support Tools Manager (STM)

Information Tool

Diagnose Tool – HP Qualified Personnel Only

Firmware Update Tool – HP Qualified Personnel Only

RS-232C Serial Port Interface

Troubleshooting Strategies

This chapter provides troubleshooting strategies for determining if the SSB or any other component is faulty. Troubleshooting the SSB may be difficult because the source of the problem can be the SSB, the host, the devices, or the connections between them. To begin troubleshooting:

1. Observe the symptoms and gather information about when and where symptoms of the problem occur. Note any errors logged by the SSB or view the error log from the Support Tools Manager (STM) program.
2. Isolate the problem to the host driver, the host FC adapter, FC cable, SSB, SCSI cable, or SCSI device.
3. If the problem is the SSB, isolate the component in the SSB that is causing the problem. Replace the suspect assembly. Refer to chapter 6, Adding and Replacing Parts, for information about replacing components.
4. If the problem is not the SSB, refer to the documentation for the hardware or software causing the problem.
5. Rerun the self test and check the SSB to make sure the problem is solved.

Determining if the Problem is Between the Host and SSB

From the host, type **`ioscan -f`** to verify that the SSB hardware path is “claimed.”

1. If the hardware path (H/W Path) is missing, the problem can be with the FC device, FC adapters, or FC cables. Refer to *HP Fibre Channel Mass Storage Adapter Service and User Manual* (A3636-90002) for information on troubleshooting the host driver and FC adapters.
2. If the S/W State column is “Unclaimed,” the hardware is not operational. Check to make sure the correct driver is installed.
3. If the S/W State is “No H/W,” the problem may be with the SCSI devices or their connections.

4. You can also use STM and the HP-UX tool fcmsutil to assess the state of the FC connection on the host. For information on using STM, see Using Support Tools Manager (STM) on page 108. For information about fcmsutil, see *HP-UX System Administration Tasks Manual* (B2355-90079).

Determining if the Problem is the SSB

1. Check the SSB Slot Status Screen for the message “ERR” or “Fatal Error.”
   - If ERR appears, see Error (ERR) Mode on page 93.
   - If Fatal Error appears, see Fatal Error Mode on page 94.
2. Check the SSB Menu error log for errors. For information on using the error log, see Viewing the Error Log on page 89 and Using Support Tools Manager (STM) on page 108.
3. Visually inspect the LEDs. For information on LED behavior, see LED Indicators on page 102.
4. Run the SSB Self Test from the Diagnostics Menu. Review the results in the error log if the test failed.

Determining if the Problem is with the SCSI Cables or Devices

1. Use the SCSI Status Menu to determine if the SSB senses the presence of the SCSI devices.
2. Visually inspect the connections between the SSB and SCSI devices.
3. Use IOSCAN or STM’s Rescan option. (Both options can take a while to complete.) If the output shows a path to the FC SCSI bus but “No H/W” to the SCSI targets, the problem may be with the SCSI devices or the SCSI cables.
4. Review the LED chart to help isolate the suspect assembly.

Determining if the Problem is with the FC Cables or Adapters

If the FC Activity LED on the rear panel is not blinking, the FC may not be making contact with the host SPU. To determine if the FC-host connection is faulty, attempt the following corrections:

1. Confirm the connection by unplugging and reconnecting the cable and performing an External Loop Test (see Using the Diagnostics Menu on page 105).
2. Check the FC adapter on the host or other initiator by connecting a loopback cable (HP part 1005-0624) and running the initiator's diagnostics program, for example, fcmsutil.

Note The loopback cable is a diagnostic tool that is shipped with various FC products. An additional cable can be obtained. Using an optical port protector to perform tests that require a loopback cable can give false results.

3. If the FC adapter is good, check the FC cable by connecting a loopback cable with a special adapter to the initiator end of the FC cable and performing an External Loop Test.
4. If the External Loop Test fails, carefully clean the ends of the FC cable with a lint-free wipe optionally treated with HP tool-grade isopropyl alcohol. Reconnect the cable and repeat step 4.
5. If the External Loop Test fails after cleaning the cable, replace the cable with a known good cable.

Note Fiber optic cables may not be functioning properly even though light passes through them.

Observing the Symptoms

Table 10 Overview of Symptoms: Host Side

Symptom	Possible causes	Recommended action
The host cannot read or write to devices connected to the SSB.	There could be a faulty FC connection, SCSI bus or connection between the SSB and its device. Also, the device itself could be faulty or marginal.	Use the SSB menu to check FC link status and SCSI device status.
An unusual number of SCSI devices reset.	There could be a wide variety of causes; for example, a SCSI terminator could be missing. Check the manual that came with the SCSI device for possible causes.	Check the SCSI hardware and terminators. Check to see if the host bus adapter includes on-board termination and termination power or if they must be supplied externally.
Input/output performance is slow.	Host system parameters may need to be changed. Fiber optic connections may be damaged.	Refer to the manual that came with the host FC adapter for information on tuning parameters. Replace cables.
The host sees path to SSB but does not see path to target and LUN.	Hardware (adapters, cables, etc.) may be faulty or marginal.	Use the procedure listed on page 88.
The host does not recognize the SSB or targets and LUNs.	FC hardware is faulty. HP-UX does not have FC driver or updated FC driver. SSB is offline.	Use the procedures on pages 86 and 88.

For additional information on troubleshooting the problem, see:

- *Configuring HP-UX for Peripherals* (HP 9000) (B2355-90053)
- *HP Fibre Channel Mass Storage Adapter Service and User Manual* (A3636-90002)
- *HP-UX System Administration Tasks Manual* (B2355-90079)
- The manual that came with the SCSI device

LED Indicators

Table 11 Front Panel LED Indicators

Power ON = green	**Activity** ON = blinking	**Fault** ON = amber	**Description**	**Recommended Action**
OFF	OFF	OFF	No power to the SSB; the SSB power switch could be off, or the power supply or power supply cable is faulty	Press the Power button to turn the SSB on. If the SSB does not power on, try inspecting the cables or replacing the power supply.
ON	ON	ON	SSB is powering on.	This is the normal power-up sequence. No action is required.
ON	OFF	OFF	SSB is self testing.	
ON	*	OFF	Normal Active State	
ON	*	ON	If the Fault LED stays on more than 60 seconds, a fault has occurred. THe SSB logs the error and goes into Error or Fatal mode.	In Error mode, use the Diagnostics Menu to isolate the faulty component. If the LCD displays a fatal error, contact an HP service representative for help. For certain errors during hardware initialization, no errors codes will be logged or displayed and the front panel will be unresponsive.
ON	OFF	blinking	SSB is offline if the front panel Fault LED is blinking and all six Install LEDs on the rear panel are blinking. This is the Diagnostics mode.	To return online, see Returning Online on page 107.

* = OFF, ON, or blinking

Note If the Fault LED on the front panel and the Fault LEDs on the rear panel remain on, contact an HP service representative.

Table 12 Rear Panel LED Indicators

Install ON = green	**Activity** ON = blinking	**Fault** ON = amber	**Indicator Of**	**Recommended Action**
ON	ON	ON	If all 18 LEDs remain on after the SSB powers up, the power supply or motherboard is faulty.	Contact an HP service representative.
ON	OFF	ON	The FC or SCSI adapter with the Fault LED on is faulty.	Replace the adapter.
OFF	OFF	ON	The SSB does not recognize the adapter in the slot with the LEDs on. For example, an FC adapter may be in a SCSI slot.	Remove adapter. Replace with correct adapter if needed.
OFF	OFF	OFF	The SSB does not recognize the adapter in the slot. No adapter is installed, the adapter is faulty, or the wrong adapter is installed.	Replace the adapter.
blinking	OFF	OFF	The adapter associated with the blinking LED is offline. Only SCSI bus adapters can be placed offline individually.	To return online, see Returning Online on page 107.
blinking (all 6 LEDs)	OFF	OFF	The SSB is offline if the Install LEDs of all installed adapters are blinking and the front panel Fault LED is blinking.	None

About the SSB Diagnostics Menu

When you choose the Diagnostics Menu from the Main Menu, the SSB prompts for confirmation that you want to take the SSB offline. You must answer “yes” in order to use the Diagnostics Menu. Before the SSB goes offline, all inputs and outputs are terminated.

Note When the SSB is offline, the front panel Fault LED and all six Install LEDs on the back panel blink.

It is recommended that you review the SSB Control Panel Quick Reference (see appendix) before using this menu. The Diagnostics Menu provides the following tests:

- Control Button Test (control buttons on the front panel)
- FC External Loopback Test (requires a loopback cable attached to the FC adapter’s external FC connector)
- FC Internal Loopback Test
- LCD Display Test
- LED Test (front and rear panel LEDs)
- Memoryboard Test
- Motherboard Test
- SSB Self Test
- SCSI Internal Loopback Test

Note The loopback cable is shipped with various Fibre Channel products. An additional cable can be obtained. Using an optical port protector to perform tests that require a loopback cable can give false results.

Using the Diagnostics Menu

1. Press <**MENU**> to display the Main Menu. For example, the LCD displays:

```
Main Menu
[SSB Menu]
```

2. Press ▲ to display the Diagnostics Menu. The following example shows the Diagnostics option from the Main Menu:

```
Main Menu
[Diagnostics Menu]
```

3. Press <**ENTER**> to select the Diagnostics Menu. The following message displays:

```
Take SSB offline for
diagnostics? [No]
```

4. Press ▼ to select Yes and press <**ENTER**>. The screen displays:

```
Diagnostics Menu
[Cntrl Button Test]
```

5. To view the other tests, press ▼. When the test you want to run appears in the LCD, press <**ENTER**> to select it. For loop tests, select the specific FC or SCSI adapter, and for all but the motherboard test, select 1 or 10 times to run the test. Figure 22 shows all of the menu options.
6. When each test is complete, the results will display.
7. Press <**CANCEL**> to exit the test and return to the previous screen.
8. Press <**CANCEL**> to exit the Diagnostics Menu and return online. See Returning Online on page 107.

Accessing Diagnostic Tests

All the diagnostic tests are accessible once the SSB has been taken offline. Diagnostic tests can take up to two minutes each to perform.

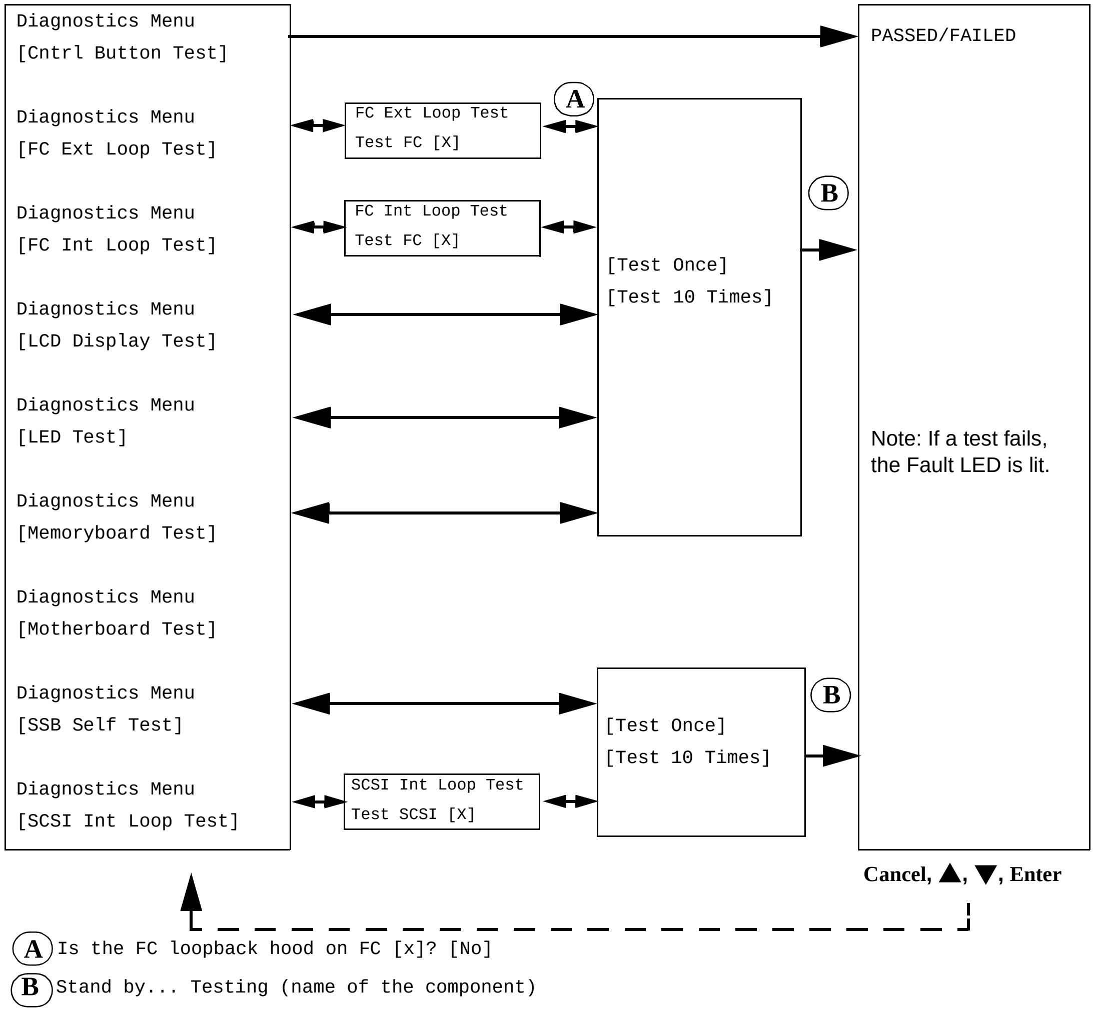


Figure 22 Diagnostic Test Menu Map

Returning Online

The SSB is offline when it is in Diagnostics Mode. When the SSB is offline, the front panel Fault LED and rear panel Install LEDs blink. When the SSB returns online, the LEDs stop blinking.

1. Press <**CANCEL**> until the following message displays:

   ```
   Exit diagnostics and
   go Online? [No]
   ```

2. Select the ▲ or ▼ button to change the response to Yes and press <**MENU**>.
3. The SSB returns online and displays the Main Menu. The Fault LED on the front panel and the Install LEDs on the back panel stop blinking. This step can take up to two minutes to complete.
4. Verify that the SSB is linked (speaking) to the host. Check the status of the FC adapter(s) in the Slot Status Screen or check whether the link is up or down in the FC Status Menu. The symbol “+” means the affected FC is online.

   If the symbols “-” or “?” display in the Slot Status Screen next to the affected FC, the SSB is not communicating with the host.

   For information on accessing the FC Status Menu, see Using the FC Status Menu on page 75.

Using Support Tools Manager (STM)

STM is a software application that can be run from the host console to get status and descriptive information about the SSB and its devices. STM comes with HP-UX instant ignition and support media. Three tools in STM apply to the SSB:

- **Information Tool**. Provides information about the SSB and paths to SCSI devices connected to the SSB without resetting the SSB.
- **Diagnose Tool**. Runs a self test on the SSB. This test should be run only by qualified personnel. See “Passwords and Support Tool Access” in the *Support Tools Manager User’s Guide* for more details.
- **Firmware Update Tool**. Allows the user to download a new version of the SSB firmware. This test should be run only by qualified personnel. See “Passwords and Support Tool Access” in the *Support Tools Manager User’s Guide* for more details.

STM can be run in three ways:

- Menu mode
- X Windows environment
- Command mode

Note In STM, the terms FC SCSI MUX and MUX are synonymous with SSB.

Information Tool

Running Information Tool in Menu Mode (STM Version A.08.00 or later)

1. At the system prompt:
   - Type **mstm**
2. To select the SSB and run information tool**:**
   - Select OK.
   - Scroll down using the arrow key, select FC SCSI MUX, and press <**ENTER**>.
   - Type **i** and press <**ENTER**>**.** (The word “information” will appear in the bottom left corner.)
   - Select Done when done viewing the log.
3. To exit the Information tool:
   - Select File.
   - Select Exit.
   - Select OK.

Running Information Tool in Menu Mode (STM Version up to A.08.00)

1. At the system prompt:
   - Type **mstm**
2. To select the SSB:
   - Select device.
   - Scroll down using the arrow key, select FC SCSI MUX, and press <**ENTER**>.

3. To run the Information tool:
    - Select previous menu.
    - Select tools.
    - Select information.
    - Select run.
4. To view output from information log:
    - Select info log.
    - Select Done when done viewing log.
5. To exit the Information tool:
    - Select Exit.
    - Select OK.

Running Information Tool in the X Windows Environment

1. At the system prompt:
    - Type **xstm &**
2. Click on the FC SCSI MUX device icon.
3. To run the Information tool:
    - Select Tools.
    - Select Information.
    - Select Run.
    - Select Done when done viewing log.
4. To exit Information tool:
    - Select File.
    - Select Exit.

Running Information Tool in Command Mode

1. At the system prompt:
   - Type **cstm**
2. To select the SSB:
   - Type **map**
   - Type **sel dev x** (where x is the FC SCSI MUX device number)
3. To run the Information tool:
   - Type **info**
4. To view the Activity Log:
   - Type **ial**
   - Type **d** for Done.
5. To view the Information Log:
   - Type **il**
   - Type **d** for Done.
6. To view the Failure Log:
   - Type **ifl**
   - Type **d** for Done.

   (Failure Log option is enabled when the Information tool fails and the Failure Log is created.)
7. To exit the Information tool:
   - Type **exit**
   - Type **ok**

Interpreting the STM Information Log

To get the current status of the hardware paths to the SSB and its devices from the Information Log, you must use STM. If the SSB has a fatal error and shuts down while STM is being used, you will not be able to view the current status of the Information Log.

1. Run the Information tool for the SSB device. See Using Support Tools Manager (STM) on page 108 for details on running this tool in various modes.
2. Under Tools, select the Information Menu; then select Information.

Use Figure 23 as a guide to interpret the STM Information Log.

See chapter 3, Configuration, for information on interpreting hardware paths.

```
1  Log creation time:     Mon Jan 6 10:15:36 1997
2  Hardware path:    8/12.8.0.0.0
3  Product Id:         HPA3308           Vendor: HP
4  Device Type:        FC SCSI MUX
5  Device Qualifier:   HPA3308
6  Product Revision:   3840
7  Node Name:     2000FFFFFFFFFF73
8  FC Port Connected to : FC B
   Port Type Information:
9  Port A:           Port is present and topology is unknown.
10 Port B:           FC_NL_Port, Loop, Link Speed: 1063MB Short Wave
11 Port 0:           Not present
12 Port 1:           Parallel SCSI, 16-Bit, Differential, Fast, SCSI_ID 7
13 Port 2:           Parallel SCSI, 16-Bit, Differential, Fast, SCSI_ID 7
14 Port 3:           Parallel SCSI, 16-Bit, Differential, Fast, SCSI_ID 7
   Fan Status:
15 Right Fan: Good.           Left Fan: Good.
16 Fan(s) speed: Low.
   LED Status:
                                 Installed                   Fault

17 SCSI 0:                       OFF                         OFF
18 SCSI 1:                       ON                          ON
19 SCSI 2:                       BLINKING                    OFF
20 SCSI 3:                       ON                          OFF
21 FC B:                         ON                          OFF
22 FC A:                         ON                          OFF

                                 Power                       Fault
23 SCSI MUX:                     ON                          ON

   Note:-
24                  BLINKING = LED is blinking which means the unit is offline.

25 Error log information, if any, is logged in Activity log.
```

1 The date and time you ran this tool. Note that the time stamp in the SSB Error Log and the time stamp in the STM Information Log are not the same.

2 The hardware path that was selected in STM. See chapter 3 for more information on hardware paths.

3 The product identification. For the SSB, the product HP A3308 is the same for HP A3511A and HP A3511AZ.

4 A description of the hardware for the device that was selected.

5 The vendor identification and HP product number.

6 The version of the SSB firmware.

7 The unique identifier, a 64-bit value the factory assigns to the SSB.

8 The FC port the Information Log is using.

9 Status of Port A. This example shows that a device is present, but the communication protocol (loop) has not been established.

10 Status of Port B. Shows the topology, speed, and laser type of the FC adapter in Port B.

11-14 Status of Ports 0-3. Shows the type of SCSI connection (parallel), type of SCSI adapter in use (16-bit, Differential, Fast), and the SCSI adapter ID. If a SCSI adapter is not detected, the status shows “Not Present.”

15 Shows fan status, “good” or “bad.” A “bad” fan is not operating and needs replacing.

16 Shows fan speed.

17-22 Status of Install and Fault LED lights on back panel. “Installed” is ON if device is installed, BLINKING if device is installed but offline, OFF if not installed. When “Fault” is ON, communication with the device has been lost; “Fault” is OFF when the connection is good.

23 Status of SSB. Shows whether SSB is on or off and whether a fault (loss of communication) has occurred at any of the ports.

24 Help text explaining how to interpret blinking LED status.

25 Help text explaining where to find error information.

Figure 23 Interpreting a Sample Output of the Information Log

Using and Interpreting the STM Activity Log

Follow these steps to update the STM Activity Log. If the SSB has a fatal error and shuts down, you will not be able to retrieve the Error Log using these steps.

1. Select the SSB device.
2. Run the Information tool.

Note Use Rescan only if the configuration of the devices changed since the SSB was last booted. See Using Support Tools Manager (STM) on page 108 for details on running this tool in various modes.

3. Under Tools, select the Information Menu; then select Activity Log.

   Use Figure 24 as a guideline to interpreting the Activity Log.

```
   Information Tool Activity Log for FC SCSI MUX on path 8/8.8.0.0.3

1  Log creation time: Fri Oct 18 11:46:28 1996
2  Error Log Number....................: 1
3  Location of Error...................: SCSI 1
4  Error Code..........................: 0x61198102
5  Current power cycle number..........: 10
6  Power Cycles ago the error occurred.: 0
7  Time ago the error occurred:
8  Days:0
9  Hours:0
10 Minutes1
   Possible cause(s) / Recommended action(s):
11 SCSI device test failed.
            Replace SCSI1 adapter.
```

The number in 8th position (in this case a “1”) is the error code. The other numbers are for manufacturing use only.

1 The date and time this tool was run.

2 The log lists up to 10 errors. Number 1 is the most current.
The Activity Log shows no error log information if no errors have been logged in the SSB.

3 Location where the fault occurred in the SSB (see Viewing the Error Log on page 89).

4 The error code number is the number eight places from the left of this 10-digit string.

5 The number of times the SSB was power cycled since it was first booted in the factory. This number is referred to as the “current power cycle.”

6 The difference between the SSB’s current power cycle number and the Error Log power cycle number. It is the number of times the SSB was power cycled since the error occurred.

7-10 The total number of days, hours, and minutes the SSB has been operating.

11 Description of the error and recommended repair.

Figure 24 Sample Output of the Activity Log and How to Interpret It

Diagnose Tool – HP Qualified Personnel Only

Running Diagnose Tool in Menu Mode (STM Version A.08.00 or later)

1. At the system prompt:
    - Type **mstm**
2. To select the SSB:
    - Select OK.
    - Scroll down using the arrow key, select FC SCSI MUX and press <ENTER>.
3. To install HP-Only license:
    - Select Menubar on or use arrow keys to get to Menubar.
    - Select System.
    - Select License.
    - Select Install HP-Only License.
    - Enter password.
    - Select OK.
    - Select OK again at access message.
4. To run the Diagnose tool:
    - Select Menubar on or use arrow keys to get to Menubar.
    - Select Tools.
    - Select Diagnose.
    - Select Run.
    - Select OK to start diagnostic.

5. To view results:
   - Select Menubar on or use arrow keys to get to Menubar.
   - Select Tools.
   - Select Diagnose.
   - Select Activity Log.
   - If arrows appear at the bottom of the screen, select page down to view remaining log file.
   - Select Done.
6. To exit Diagnose Tool:
   - Select Menubar on or use arrow keys to get to Menubar.
   - Select File.
   - Select Exit.
   - Select OK.

Running Diagnose Tool in Menu Mode (STM Version up to A.08.00)

1. At the system prompt:
   - Type **mstm**
2. To select the SSB:
   - Select device.
   - Scroll down using the arrow key, select FC SCSI MUX and press <ENTER>.

3. To install HP-Only license:
   - Select previous menu.
   - Select system.
   - Select more keys.
   - Select license.
   - Select Install HP-Only License.
   - Enter password.
   - Select OK.
   - Select OK again at access message.
4. To run the Diagnose tool:
   - Select previous menu.
   - Select previous menu again.
   - Select tools.
   - Select diagnose.
   - Select run.
   - Select OK to start diagnostic.
5. To view results:
   - Select diagnose activity log.
   - If arrows appear, page down to view log file.
   - Select Done.

6. To exit Diagnose Tool:
   - Select previous menu.
   - Select previous menu again.
   - Select Exit.
   - Select OK.

Running Diagnose Tool in the X Windows Environment

1. At the system prompt:
   - Type **xstm &**
2. Click on the FC SCSI MUX device icon.
3. To install HP-Only license:
   - Select System.
   - Select License.
   - Select Install HP-Only License.
   - Enter password.
   - Select OK.
   - Select OK again in HP-Only Acknowledge Box.
4. To run the Diagnose tool:
   - Select Tools.
   - Select Diagnose.
   - Select Run.
   - Select OK to start diagnostic.

   (When the test is complete, the FC SCSI MUX icon will turn green and display the message “Diagnose Successful.”)

5. To exit Diagnose tool:
   - Select File.
   - Select Exit.

Running Diagnose Tool in Command Mode

1. At the system prompt:
   - Type **cstm**
2. To select the SSB:
   - Type **map**
   - Type **sel dev x** (where x is the FC SCSI MUX device number).
3. To install HP-Only license:
   - Type **hlic**
   - Enter password.
4. To run Diagnose tool:
   - Type **dgn** (diagnose).
   - Type **ok**
   - Type **dal** (diagnose activity log).
   - Type **d** when done viewing output.
5. To exit Diagnose tool:
   - Type **exit**
   - Type **ok**

Firmware Update Tool – HP Qualified Personnel Only

Running Firmware Update Tool in Menu Mode (STM Version A.08.00 or later)

1. At the system prompt:
   - Type **mstm**
2. To select the SSB:
   - Select OK.
   - Scroll down using the arrow key, select FC SCSI MUX and press <ENTER>.
3. To install HP-Only license:
   - Select Menubar on or use arrow keys to get to Menubar.
   - Select System.
   - Select License.
   - Select Install HP-Only License.
   - Enter password.
   - Select OK.
   - Select OK again at access message.

4. To run the Firmware Update tool:
    - Select Menubar on or use arrow keys to get to Menubar.
    - Select Tools.
    - Select Firmware Update.
    - Select Run.
    - Type path to firmware file in selection box or use tabs to select.
    - Select OK to start Firmware Update.
    - Select activate the firmware immediately by pressing <ENTER>.
    - Select OK.
5. To exit the Firmware Update tool:
    - Select Menubar on or use arrow keys to get to Menubar.
    - Select File.
    - Select Exit.
    - Select OK.

Running Firmware Update Tool in Menu Mode (STM Version up to A.08.00)

1. At the system prompt:
    - Type **mstm**
2. To select the SSB
    - Scroll down using the arrow key, select FC SCSI MUX and press <ENTER>.

3. To install HP-Only license:
   - Select previous menu.
   - Select system.
   - Select more keys.
   - Select license.
   - Select Install HP-Only License.
   - Enter password.
   - Select OK.
   - Select OK again at access message.
4. To run the Firmware Update tool:
   - Select tools.
   - Select more keys.
   - Select Firmware Update.
   - Select run.
   - Type path to firmware file in selection box or use tabs to select.
   - Select OK to start Firmware Update.
   - Select activate firmware immediately.
   - Select OK.
5. To exit the Firmware Update tool:
   - Select Exit.
   - Select OK.

Running Firmware Update Tool in the X Windows Environment

1. At the system prompt:
   - Type **xstm &**
2. Click on the FC SCSI MUX device icon.
3. To install HP- Only license:
   - Select System.
   - Select License.
   - Select Install HP-Only License.
   - Enter password.
   - Select OK in HP-Only Acknowledge Box.
4. To run the Firmware Update tool:
   - Select Tools.
   - Select Firmware Update.
   - Select Run.
   - Enter path to firmware file in Information box.
   - Select OK.
   - Select activate the firmware immediately.
   - Select OK.

   (When update is complete, FC SCSI MUX icon will turn green and display “FW Update Successful” message.)
5. To exit Firmware Update tool:
   - Select File.
   - Select Exit.

Running Firmware Update Tool in Command Mode

1. At the system prompt:
   - Type **cstm**
2. To select the SSB:
   - Type **map**
   - Type **sel dev x** (where x is the FC SCSI MUX device number).
3. To install HP-Only license:
   - Type **hlic**
   - Enter password.
4. To run the Firmware Update tool:
   - Type **fwu** (firmware update).
   - Type file name including path.
   - Select activate the firmware immediately by typing **yes**

   When the update is successful, a message saying so will appear.
5. To exit the Firmware Update tool:
   - Type **exit**
   - Type **ok**

RS-232C Serial Port Interface

The Serial Port Interface provides extensive SSB, Fibre Channel, and SCSI information. The interface performs the following functions:

SSB	***Fibre Channel***	***SCSI***
status	port status	bus status
log status	port selection	bus-walk
error log status		bus selection
event log status		
SSB location		

Preparing to Use the SSB Serial Port Interface

To use the management feature on the SSB to obtain information from the SSB, you will need to do the following:

1. Obtain an copy of the SSB Firmware Version 3840 or later. Contact an HP sales office for the latest firmware.
2. Obtain a system with an RS-232C capable terminal or terminal emulator software.
3. Verify the terminal settings in your terminal emulator software. Use the following settings:
   - Baud rate: 9600
   - Data bits: 8
   - Parity bits: none
   - Stop bits: 1
4. Obtain an RS-232C cable that has a 9-pin female connector at the SSB end of the cable. (For cable information see Ordering Additional Adapters on page 166.)

Direct-Connect Terminal

The simplest method of using the SSB's serial port is to connect a terminal directly to the port. For this configuration the following hardware is required:

- HP (or EM100-capable) Terminal model, such as 700/96, option ABA
- HP 24542G RS-232C cable

Configure the Direct-Connect Terminal

1. Power up the HP terminal. Set the HP terminal to VT100 Emulation Mode or EM100 mode.
2. Press <**MENU**>, then <**SELECT**> until the function key menu appears across the bottom of the screen.
3. Press <**F8**> (config keys).
4. Press <**F5**> (terminal config).
5. Press the arrow keys to position the cursor at the TermMode entry.
6. Press <**F2**> (next choice) repeatedly until EM100 or VT100 appears in the TermMode field, then press <**F1**> (save config).
7. Check indicating EM100 mode or VT100.
8. Access the datacomm configuration screen and set the baud rate to 9600 and the parity/databits to NONE/8.
9. Press <**F1**> (save config) to save the configuration.
10. Power up the SSB as described in Powering on the SSB on page 69. The first menu screen should display.
11. Attach the 9-pin connector end of the RS-232C cable to the back of the SSB and attach the other end to the terminal. The SSB will always need a 9-pin connector while the terminal end will vary depending on the system serial port interface.

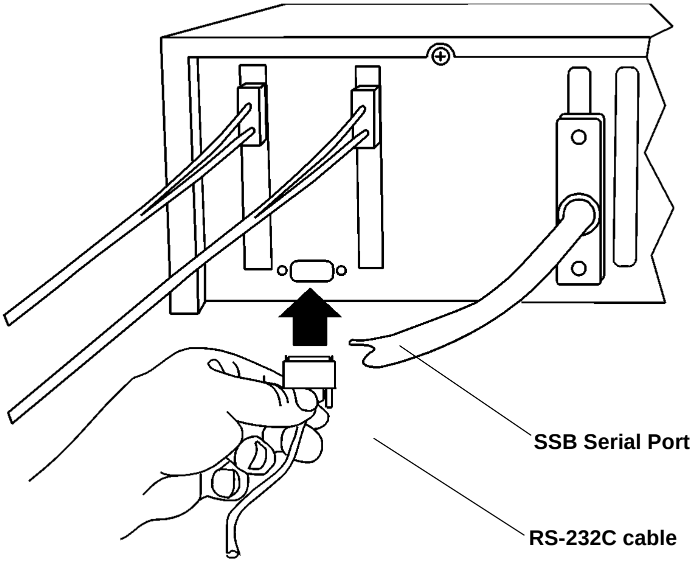


Figure 25 How to Connect the Cable to the RS-232C Port

12. Press <ENTER> or <RETURN> on terminal equipment to get to the Main Menu.
13. The following will appear when the Serial Port Interface is invoked:

```
1. SSB menu
2. Fibre Channel menu
3. SCSI menu
```

Note If the Serial Port cable is connected during “power on,” test information will appear. Accessing the port may cause slight performance degradation.

Navigating the Interface Menu

Menus begin with a title, followed by one or more menus or actions.

- To select a menu or action, type its **number** and press <ENTER> or <RETURN>.
- To quit, type **q** at any time.
- To move back to the previous screen, type **b** at any time.

Viewing SSB Status Information

1. Select the SSB menu by typing **1**
2. Select Show status by typing **1**

   A status report will appear. The following is a sample report:

```
Firmware Ver.          :xxxx of 10-20-97
Mode                   :Normal
World Wide Name        :Ox20000060b02a0240
SSB Location           :20000060b02a127a
Configuration
     FC Board A :  Installed, passed selftest, online, Type: 1 Gbps, SW
     FC Board B :  Installed, passed selftest, online, Type: 1 Gbps, SW
     SCSI Board 0  :Installed, passed selftest, online, Type: DFW
     SCSI Board 1  :Installed, passed selftest, online, Type: DFW
     SCSI Board 2  :Installed, passed selftest, online, Type: DFW
     SCSI Board 3  :Installed, passed selftest, online, Type: DFW
```

Viewing SSB Log Status Information

1. Select the SSB menu by typing **1**
2. Select Log menu.
3. Select Show status by typing **1**

   A Log Status report will appear. The following is a sample report:

```
Total Error entries                     :1
Total Event entries including errors    :5
Total power_ons                         :1
```

Viewing SSB Log Information

1. Select the SSB menu by typing **1**
2. Select Log menu.
3. Select from the following log menu options by typing the corresponding number choice:
   - Error log menu (2): shows problems detected by self test or during normal operation
   - Event log menu (3): shows latest FC address settings
   - Event and Error log menu (4): shows errors and events in chronological order which is useful in determining history of FC addresses or relationship of error to other events
   - Every log menu (5): shows entire contents of a log's routine events, such as timestamps, which may obscure useful information
4. Select from the following log menu options by typing the corresponding number choice:
   - Show first (1)
   - Show next (2)
   - Show previous (3)
   - Show last (4)

   An appropriate SSB log report will appear. The following is a sample report:

   ```
   50 Power on ago:1 Time ago:0004d:22h:42m Code:oooooooo FRU:SCSI_O
   ```

Setting SSB Location

1. Select the SSB menu by typing **1**
2. Select Set SSB location menu by typing **3**
3. Select Set SSB location by typing **1**

Note If a SSB location is not set it will revert back to the WWN set by the manufacturer.

A prompt to set the SSB location will appear. The following is an example:

```
Enter a SSB location (20 characters or less) :
```

4. Enter any combination of letters, numbers or other characters to create the SSB location.

Note The SSB location allows the Hardware Event Monitoring application (see page 172) to identify to the support staff which SSB is experiencing trouble.

Viewing SSB Location

1. Select the SSB menu by typing **1**
2. Select Set SSB location menu by typing **3**
3. Select View SSB location by typing **2**

   An SSB location will appear. The following is a sample output:

```
The SSB location is currently set to: bldg5rack4SSB3
```

Restoring SSB Location to Manufacturer Default

1. Select the SSB menu by typing **1**
2. Select Set SSB location menu by typing **3**
3. Select Restore SSB location to Manufacturer Default by typing **3**

   The SSB location will revert back to the WWN set by the manufacturer. The following is an example:

```
The SSB location is currently set to: WWN:20000060b02a0240
```

Viewing FC Port Status

1. Select the Fibre Channel menu by typing **2**
2. Select a Fibre Channel port by typing **a** or **b**

   An FC port status report will appear. The following is a sample report:

```
FC A status
     Laser type          :Short Wave
     Speed               :1063 Mbps
     Link status         :Link up
     Loop Address
          Set            :2
          Using          :2
          Node Name      :0x20000060b02a240
          Port Name      :0x20000060b02a240
```

Note For an explanation of the fields shown in the report, see Table 7 on page 78.

Selecting Another FC Port

1. Select Fibre Channel menu by typing **2**
2. Select **2** to select another port.
3. Select **1** to show status of the new port.

Viewing SCSI Bus Status Information

1. Select the SCSI menu by typing **3**
2. Select a SCSI bus by typing **#: 0-3**

3. Select Show status by typing **1**

   A SCSI bus status report will appear. The following is a sample report:

```
SCSI bus 0 status
     Type        :Differential Wide
     Speed       :20 MBps (Fast 20)
     Status      :Online
```

Doing a SCSI Bus-Walk

1. Select the SCSI menu by typing **3**
2. Select a SCSI bus by typing **#: 0-3**
3. Select Do bus-walk by typing **2**

   A SCSI bus-walk report will appear. The following is a sample report:

```
SCSI bus 3 Devices
     Count      :2
     SSB ID     :7
     Device ID list:3 4
```

Selecting SCSI Bus

1. Select the SCSI menu by typing **3**
2. Select another bus by typing **3**
3. Select bus number by typing **#: 0-3**
4. Select Show status or Do bus-walk for the new bus.

Exiting the Interface

Type **q** to quit.

6 ADDING AND REPLACING PARTS

Introduction

Removing the Top Cover and Bezel

Adding, Removing, or Replacing an FC Adapter

Adding, Removing, or Replacing a SCSI Adapter

Replacing a Memory Card – HP Qualified Personnel Only

Replacing the Fans – HP Qualified Personnel Only

Replacing the LCD – HP Qualified Personnel Only

Replacing the Power Supply – HP Qualified Personnel Only

Replacing the Motherboard – HP Qualified Personnel Only

Introduction

This chapter explains how to replace components inside the SSB. For information on identifying a problem and determining if the part needs to be replaced, refer to chapter 5, Troubleshooting.

When returning a failed part to the factory, enclose as complete a description of the problem as possible. Include error logs and any other information that will help the factory engineer identify and repair the cause.

Caution Only the FC and SCSI adapters are customer-replaceable. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

Replaceable by Customer	Replaceable by HP Qualified Service Personnel Only
FC adapter	Fan
SCSI adapter	LCD unit
	Power Supply
	Memory card
	Motherboard

For part numbers, see Ordering Replacement Parts on page 167.

Removing the Top Cover and Bezel

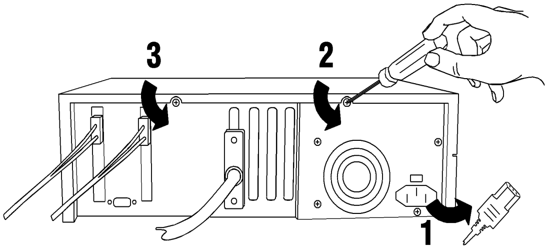
To replace the cover, reverse the order of the following instructions.

Required tools:

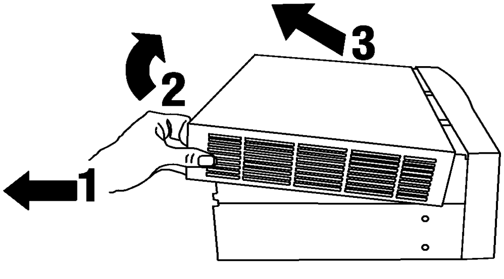
- Standard flat blade or Phillips screw driver
- ESD strap

WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the SSB cover.**

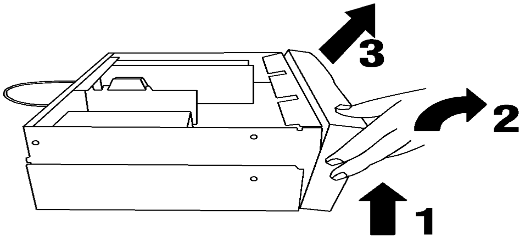
1. Power off the SSB. (Figure 1 on page 15 shows the location of the power button.)
2. Remove the screws securing the cover and disconnect the power cord. Attach the ESD strap to the chassis of the SSB.



3. Slide the cover off.



4. Remove the bezel with an upward motion and pull it off.



Adding, Removing, or Replacing an FC Adapter

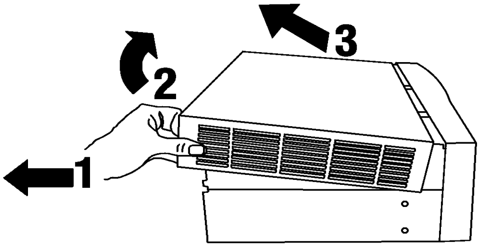
All SSBs have a factory-installed FC adapter in slot A. The SSB supports up to two FC adapters.

Required tools:

- Phillips screw driver
- The new or replacement FC adapter
- ESD strap

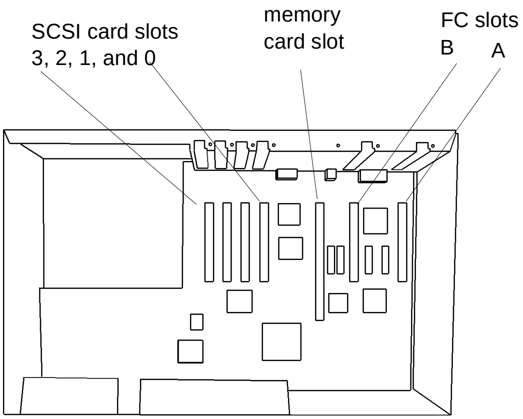
WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

1. Power off the SSB. (Figure 1 on page 15 shows the location of the power button.) Remove the power cord and cables.
2. Remove the cover. Attach the ESD strap to the chassis of the SSB or ground.

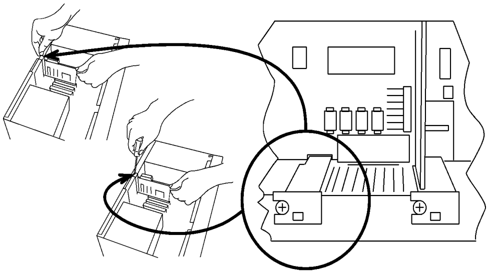


3. **If adding or replacing an FC adapter**: Remove the replacement adapter from its package and carefully remove the port protector from the FC connector without bending the pins.

Remove the slot cover from the unused FC slot or remove the old FC adapter.

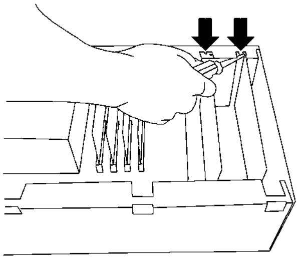


4. Insert and seat the new FC adapter. When handling an adapter or memory card, grasp the top and gently push it in (or pull it out) using a forward and backward motion.

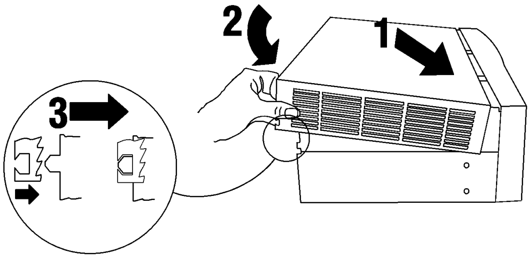


If removing but not replacing the adapter, cover the opening with a slot cover.

Replace and tighten the screw to secure the adapter.



5. Replace the cover and attach the power cord.



6. Power on the SSB. It will self test automatically. Refer to Using the FC Status Menu on page 75 to verify that the SSB recognizes the new FC adapter. Check whether the Slot Status Screen displays the FC adapter's identification. If the FC adapter identification does not display, rerun diagnostic tests.

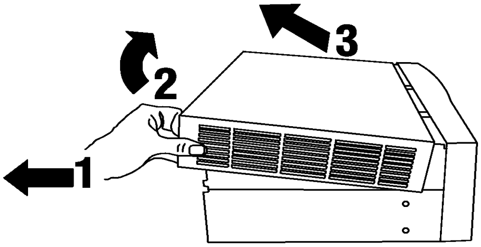
Adding, Removing, or Replacing a SCSI Adapter

Required tools:

- Phillips screw driver
- The new or replacement SCSI adapter
- ESD strap
- Slot cover if slot is to be left empty

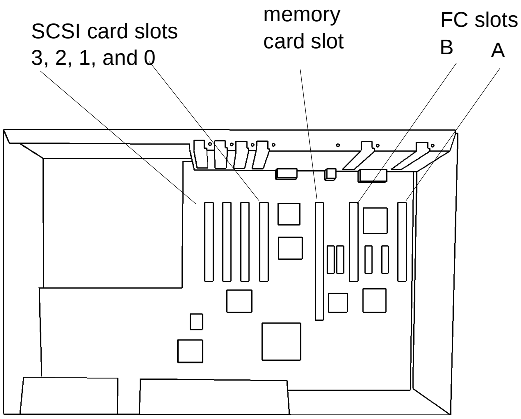
WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

1. Power off the SSB. (Figure 1 on page 15 shows the location of the power button.) Remove the power cord and SCSI cable of the SCSI adapter to be replaced.
2. Remove the cover. Attach the ESD strap to the chassis of the SSB or ground.

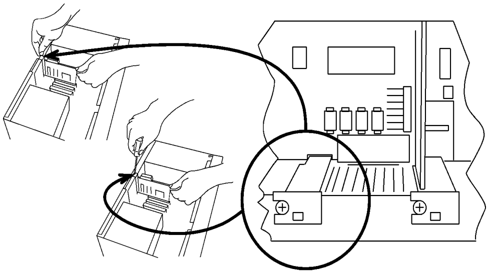


3. Remove the bulkhead screws of the adapter being replaced. If removing but not replacing an adapter, make sure there is a slot cover to cover the empty slot.

4. **If replacing an old SCSI adapter**: Remove the adapter by grasping the top of the adapter and pulling it out gently using a forward and backward rocking motion. If the slot is to be left empty, install a slot cover.

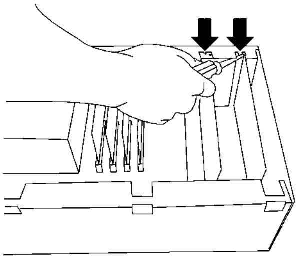


If adding a new SCSI adapter: Remove and save the slot cover. Insert and seat the new adapter in any of the available slots. While inserting the adapter, align the tabs into the appropriate slots. Replace and tighten the screw to secure the adapter or slot cover.

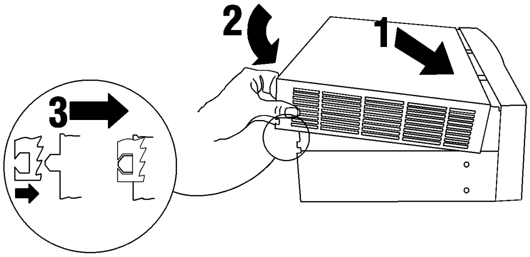


If removing but not replacing the adapter, cover the opening with a slot cover.

Replace and tighten the screw to secure the adapter.



5. Replace the cover and attach the cables and power cord.



6. Power on the SSB. It will self test automatically.

   Verify that the SSB recognizes the newly replaced SCSI adapter. Refer to Using the SCSI Status Menu on page 82 and check whether the Slot Status Screen detects the presence of the new SCSI adapter. If the SCSI adapter identification does not display, rerun diagnostic tests.

Replacing a Memory Card – HP Qualified Personnel Only

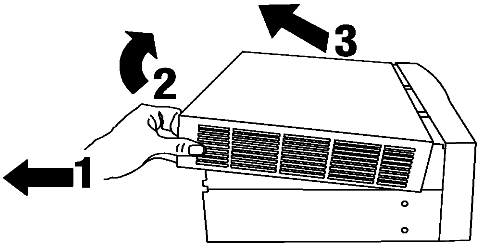
Caution Only the FC and SCSI adapters are customer-replaceable parts. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

Required tools:

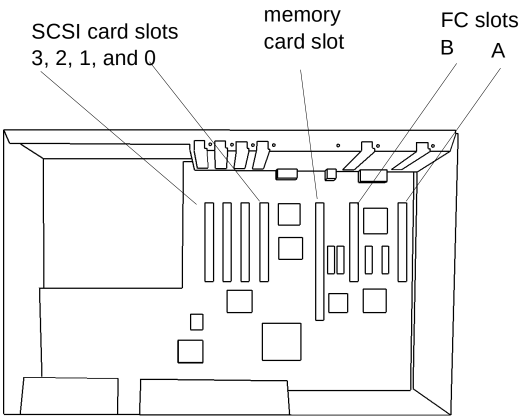
- Phillips screw driver
- The replacement memory card
- ESD strap

WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

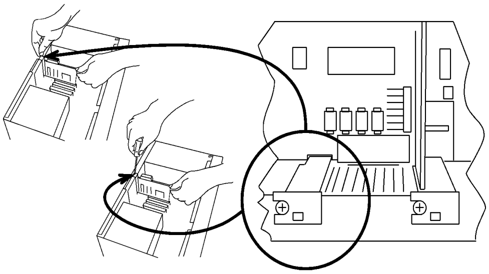
1. Power off the SSB. Remove the power cord.
2. Remove the cover. Attach the ESD strap to the chassis of the SSB.



Remove the bulkhead screw of the memory card.

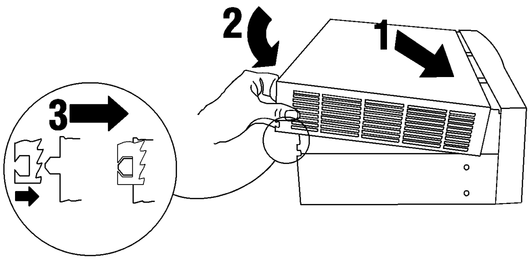


3. Remove the memory card by grasping the top of the card and pulling it out gently, using a forward and backward rocking motion.



4. Insert and seat the new memory card in the memory card slot. While inserting the memory card, grasp the top and gently push the card down, using a forward and backward rocking motion. Replace and tighten the bulkhead screw to secure the memory card.

5. Replace the cover and attach the power cord.



6. Power on the SSB. It will self test automatically. Verify that the Slot Status Screen displays “OK.” If not, rerun diagnostic tests.

Replacing the Fans – HP Qualified Personnel Only

Caution Only the FC and SCSI adapters are customer-replaceable parts. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

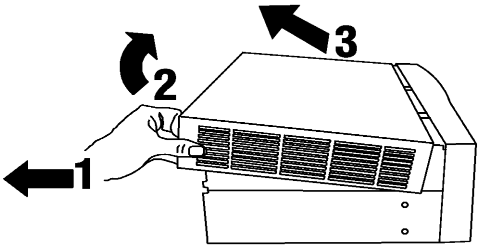
Required tools:

- Standard flat blade or Phillips screw driver
- Replacement fan
- ESD strap

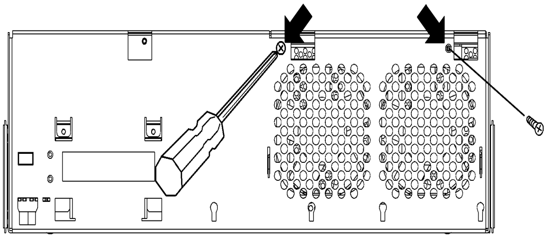
WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

1. Power off the SSB and remove the power cord.

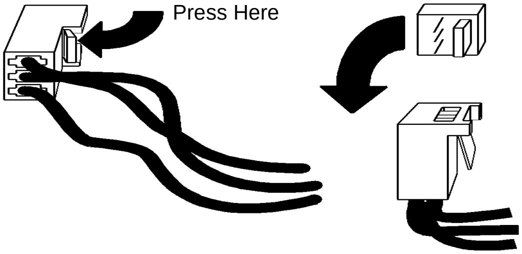
   Remove the cover and front bezel.



2. Attach the ESD strap to the chassis of the SSB. Remove the fan assembly screws.



3. Disconnect the fan connectors from the motherboard by pressing the tab on the connector's side.

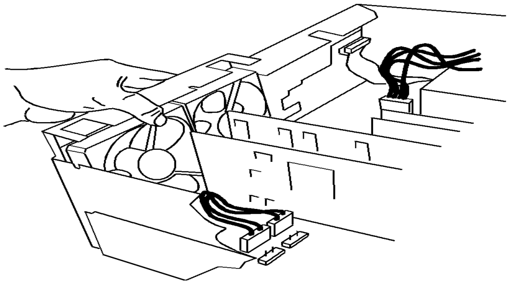


Note Because of the close proximity of the fan to the FC cards, you may need to use long nose pliers or hemastats to remove the fan.

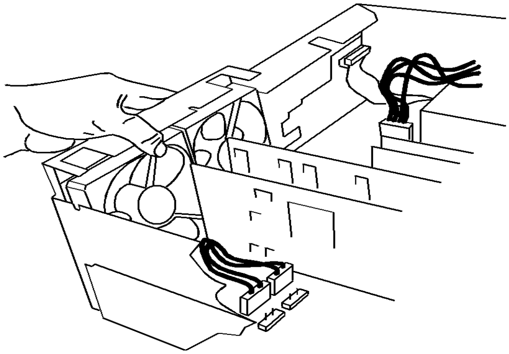
4. Grasp the top of the old fan unit and pull it up and out.

   Do not dissemble the unit.

   Insert the new fan

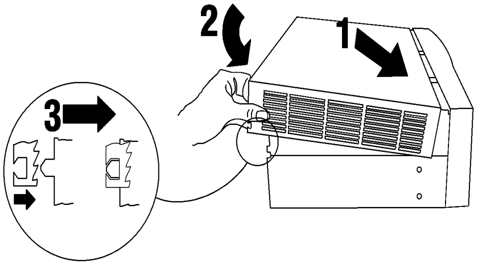


5. Connect the fan cables and insert the new fan. Note the orientation of the tabs when inserting the male and female connectors. Replace and tighten the screws to secure the fan assembly.



6. Replace the front bezel and the cover. Reconnect the power cord. Secure the cover screws.

   Power on the SSB. It will self test automatically. See whether the Slot Status Screen displays “OK.” If not, rerun diagnostic tests.



Replacing the LCD – HP Qualified Personnel Only

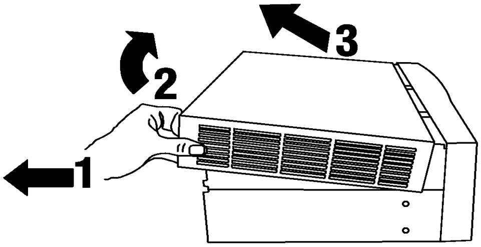
Caution Only the FC and SCSI adapters are customer-replaceable parts. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

Required tools:

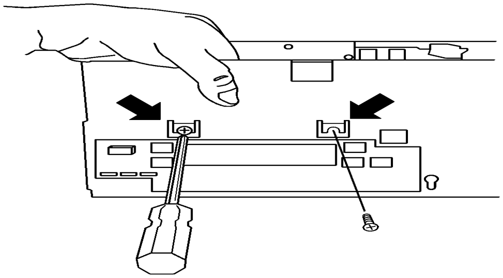
- Standard flat blade or Phillips screw driver
- Replacement LCD
- ESD strap

WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

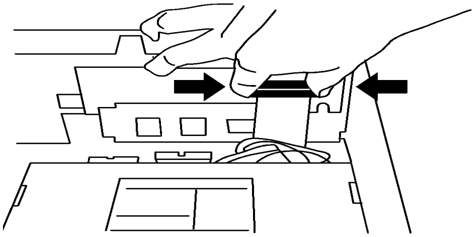
1. Power off the SSB and remove the power cord. Remove the cover and bezel.



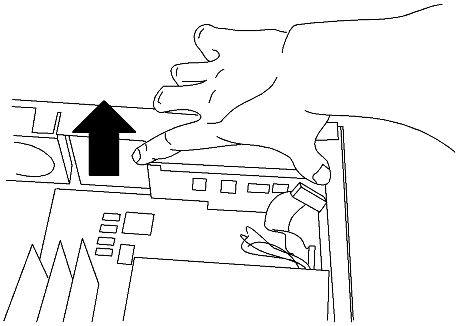
2. Attach the ESD strap to the chassis of the SSB. Remove the screws attaching the LCD to the front of the chassis.



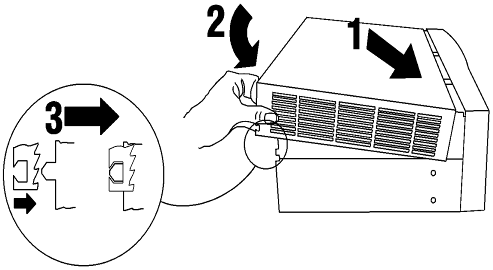
3. Disconnect the ribbon cable attached to the LCD by squeezing the connector's tabs and pulling the connector away from the LCD.



4. Pull the LCD unit out and replace it with the new one. Reconnect the cables and replace the screws. Make sure to seat the panel in the notches. If this is done incorrectly the panel buttons may not work properly.

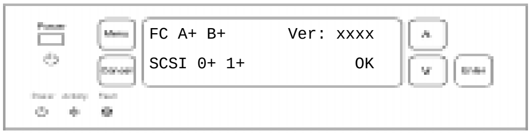


5. Replace the bezel and cover. Reconnect the power cord.



6. Power on the SSB. It will self test and check the new LCD.

   If the Slot Status Screen does not display "OK," rerun diagnostic tests.



```
FC A+ B+       Ver: xxxx
SCSI 0+ 1+            OK
```

Replacing the Power Supply – HP Qualified Personnel Only

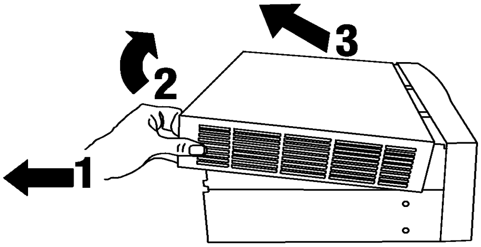
Caution Only the FC and SCSI adapters are customer-replaceable parts. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

Required tools:

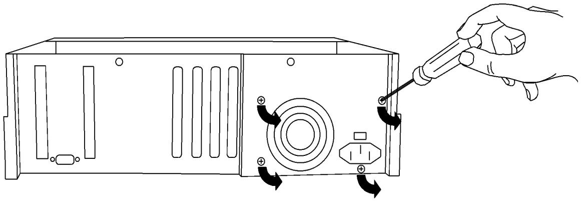
- Standard flat blade or Phillips screw driver
- Replacement power supply
- ESD strap

WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

1. Power off the SSB and remove the power cord and cover. Attach the ESD strap to the chassis of the SSB or ground.



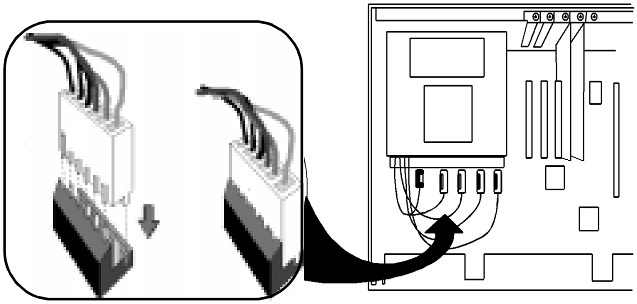
2. Remove the screws that secure the power supply to the rear panel.



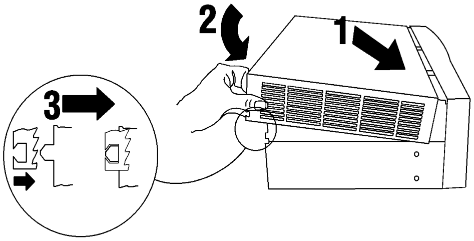
3. Unplug the power supply connectors. Disconnect power cable connectors P12, P13, P14, P15, and P16. They can be disconnected in any order.
4. Grasping the power supply, lift it up. If there is resistance, slide the power supply toward the center of the SSB before lifting out.
5. Make sure the supply is engaged to the tabs on the bottom of the chasis when reinstalling.

   Insert the new power supply.

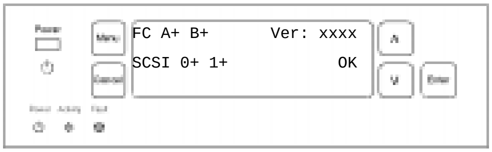
   Connect P12 to its mating connector. Connect P13, P14, P15, and P16 to the connectors on the motherboard in any order. A mismatch will not affect the unit.



6. Replace the four screws that attach the power supply to the rear panel. Lift the power supply to align the back panel holes to the holes in the power supply.
7. Replace the cover and reattach the power cord.



8. Power on the SSB. It will self test automatically. If the Slot Status Screen does not display “OK,” rerun diagnostic tests.



```
FC A+ B+       Ver: xxxx
SCSI 0+ 1+            OK
```

Replacing the Motherboard – HP Qualified Personnel Only

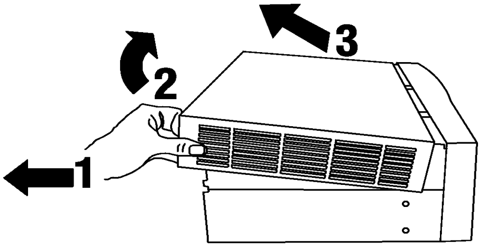
Caution Only the FC and SCSI adapters are customer-replaceable parts. Replacement of other parts by non-HP qualified personnel will void the SSB's warranty.

Required tools:

- Standard flat blade or Phillips screw driver
- Torx screw driver
- 3/16 nut driver
- Replacement motherboard
- ESD strap

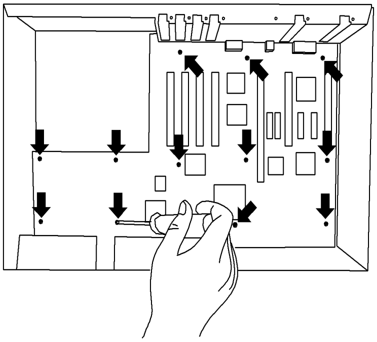
WARNING **The power cord is the main disconnect for this product. To protect against shock hazard, always unplug the power cord before removing the cover of the SSB.**

1. Power off the SSB and remove the cables, front cover, and bezel. Attach the ESD strap to the chassis of the SSB.

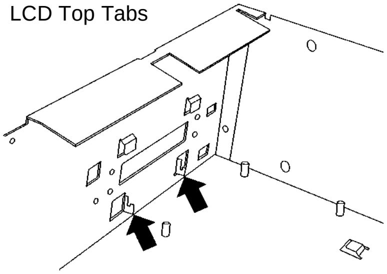


2. Remove the LCD (see Replacing the LCD – HP Qualified Personnel Only on page 150).

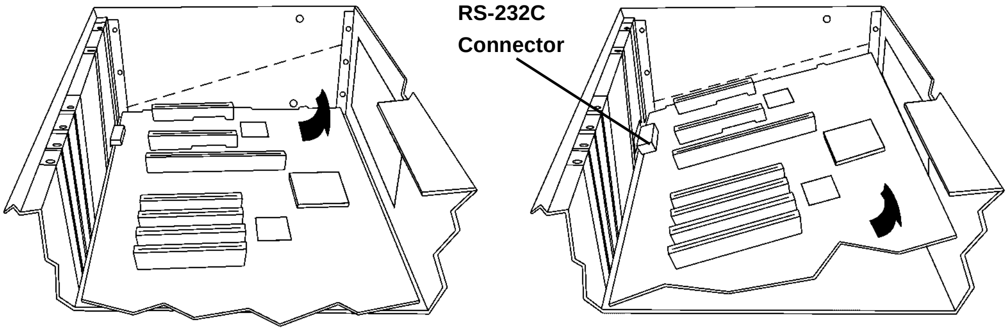
3. Remove all adapters and the memory card (see Adding, Removing, or Replacing an FC Adapter on page 139, Adding, Removing, or Replacing a SCSI Adapter on page 142, and Replacing a Memory Card – HP Qualified Personnel Only on page 145).
4. Remove the fans (see Replacing the Fans – HP Qualified Personnel Only on page 147).
5. Remove the power supply (see Replacing the Power Supply – HP Qualified Personnel Only on page 152).
6. Remove the two 4-40 nuts that hold the RS-232C port in place.
7. Remove the twelve 6-32 Phillips screws. Hold on to the screws to avoid dropping them into the chassis during removal. Be careful not to scratch the traces.



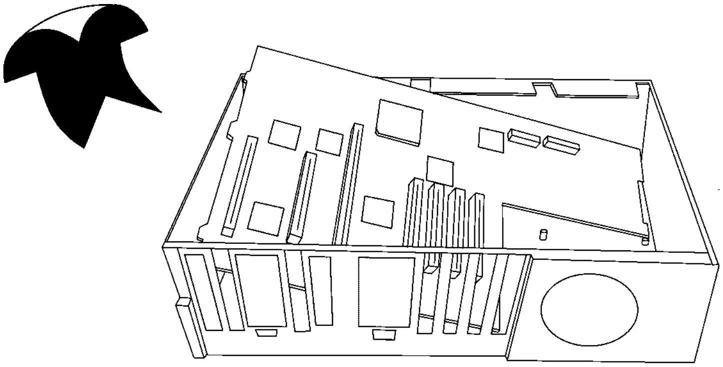
8. From the back of the machine, with the fingers of your right hand under the inside corner of the motherboard and your left hand holding one of the FC adapter slots, tilt the front edge of the board up above the top tabs of the LCD.



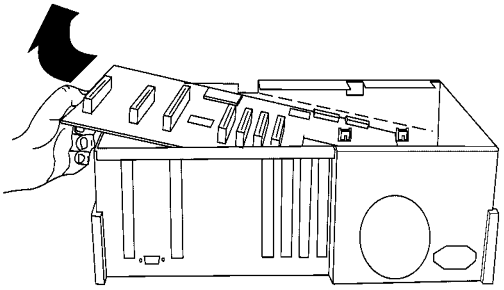
The dotted line below shows the correct angle. Push the board against the front of the chassis so that the RS-232C connector clears the back of the chassis.



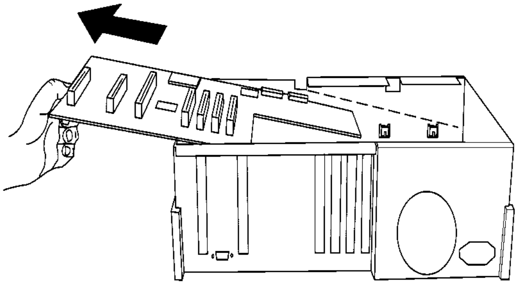
9. Gently twist and rotate the motherboard until the left front corner clears the chassis.



10. Lift the entire left edge of the motherboard high enough to clear the chassis.



11. Carefully slide the motherboard out of the chassis, maintaining the angle until the right edge of the board clears the flange above the LCD panel. Be careful not to snag the ESD strips on the rear of the chassis with the motherboard standoffs.



12. To install the replacement motherboard, from the back of the machine, drop the right end of the motherboard about 30 degrees and slide the board into the chassis from left to right so that the right end enters below the top LED tabs. Keep the motherboard flush against the front of the SSB.
13. Without dropping the front edge, lower the back edge of the motherboard and insert the RS-232C connector into its opening.
14. Gently lower the front of the motherboard until the board is properly seated.
15. Replace everything in reverse order. The Slot Status Screen should display “OK”; if it does not, rerun diagnostic tests.

7 REFERENCE

Standard Configuration

HP A3308A, HP A3511A, and HP A3511AZ Configuration Options

RS-232C Serial Port Interface Cable Information

Ordering Additional Adapters

Ordering Replacement Parts

Operating Requirements

Hardware Event Monitoring

Environmental Specifications

Physical Characteristics

Regulatory Statements

Laser Safety

Related Documents

Standard Configuration

There are three SSB configurations:

HP A3308A	Standalone/Desktop Model
HP A3511A	Field-Racked Model
HP A3511AZ	Factory-Racked Model

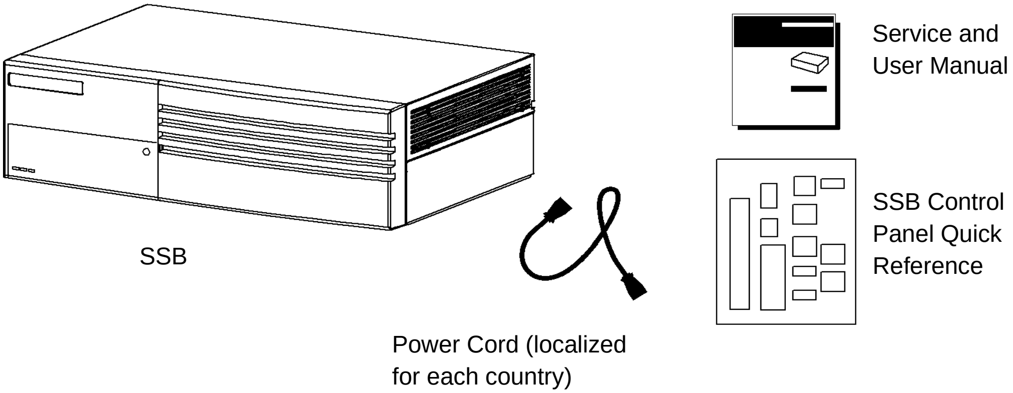

Service and User Manual
SSB Control Panel Quick Reference
SSB
Power Cord (localized for each country)

Figure 26 HP A3308A Standalone/Desktop SSB

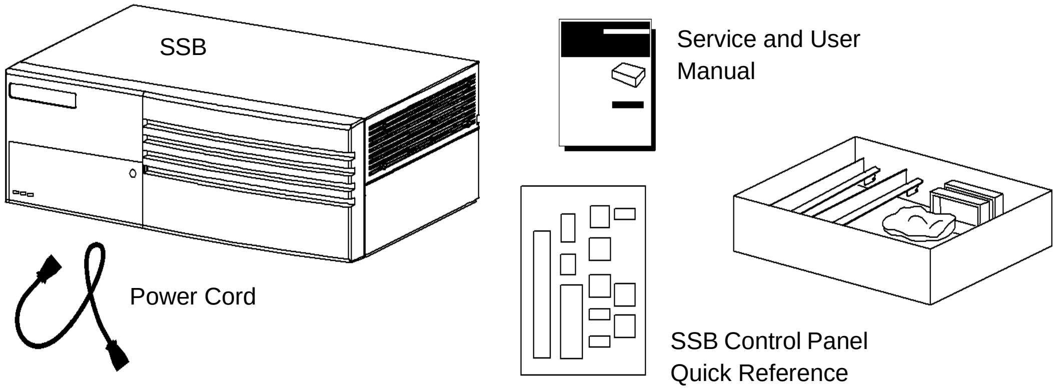


Figure 27 HP A3511A Field-Racked SSB

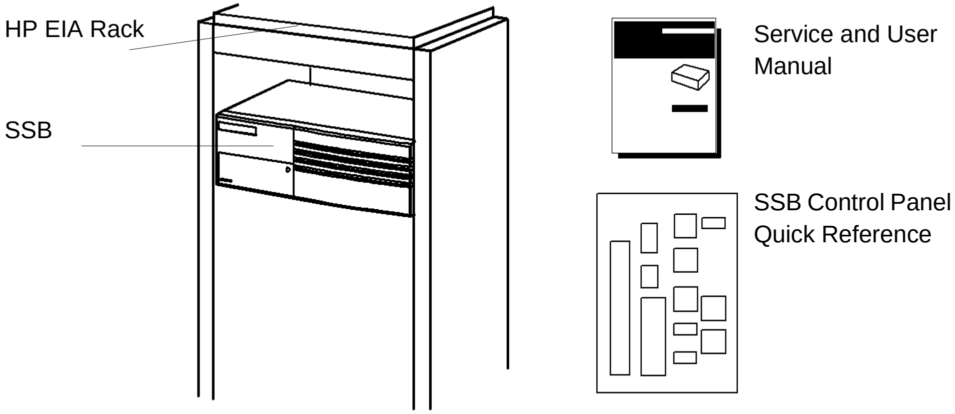


Figure 28 HP A3511AZ Factory-Racked SSB

HP A3308A, HP A3511A, and HP A3511AZ Configuration Options

The basic SSB configuration is one FC adapter (option 004) and one SCSI adapter (option 003). Expanded configurations allow two FC adapters and up to four SCSI adapters. Additional options include fiber optic cables of various lengths. For example, a field-racked SSB with one FC adapter, one SCSI adapter, and a 16-meter fiber optic cable is product A3511A with options 004, 003, and 0Z4. (See table 13 for option codes.) SCSI cables are ordered separately. To order additional FC or SCSI adapters and cables, see “Ordering Additional Adapters” on page 166. To order a part that needs to be replaced, see “Ordering Replacement Parts” on page 167.

Table 13 HP A3308A, HP A3511A, and HP A3511AZ Configuration Options

Part	Option Number	Description and Cable Options
FC Adapters	004	Includes a 1063-Mbit short wave, non-OFC FC adapter
Cables (must be fiber optic, not copper)	0Z4	Includes a 16-meter short wave FC cable
	0Z5	Includes a 50-meter short wave FC cable
	0Z6	Includes a 100-meter short wave FC cable
SCSI Adapter	003	Includes a 16-bit Fast-Wide Differential SCSI adapter
	Order all SCSI cables separately.	

RS-232C Serial Port Interface Cable Information

The SSB will always need a 9-pin connector while the terminal end will vary depending on the terminal used. Refer to the manual for the terminal emulator software you are using for cable information. An example of one of many possible RS-232C cables follows:

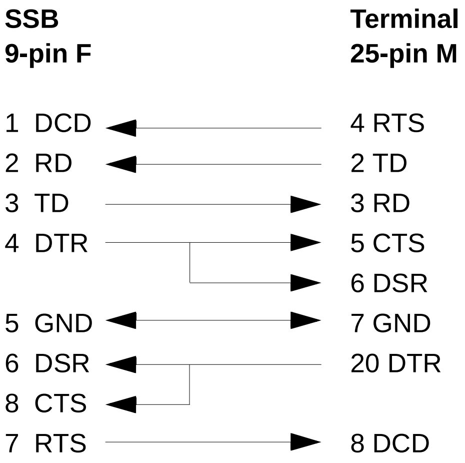


Figure 29 24542G RS-232C Cable Pinouts

Ordering Additional Adapters

Each SSB needs at least one FC adapter and one SCSI adapter to operate but supports as many as two FC adapters and four SCSI adapters.

1. To add adapters to an existing SSB, determine the number and type of adapters to be ordered. For example, if ordering an FC adapter, make sure that an FC slot is available in the SSB. Also obtain the speed and wave type specifications of the FC adapter in the host or FC device to which the new adapter will be connected. The new adapter must have the same speed and wavelength type.

Table 14 Add-On Options: Adapters

Option	Product Number	Description
FC Adapter	A3512A	1063-Mbps short-wave, non-OFC FC adapter
SCSI Adapter	A3509A	16-bit, Fast-Wide Differential SCSI adapter

2. Identify the cables you may need. For FC adapters, the physical connection must be fiber optic, not copper. The cable must match the type and speed of the adapter being ordered.

Table 15 Add-on Options: Cables

Cables	Product Number	Description
FC Cable	A3531A	16-meter short wave FC cable
	A3583A	2-meter short-wave FC cable
	A3735A	50-meter short wave FC cable
	A3736A	100-meter short wave FC cable
SCSI Cables	To order SCSI cables, contact an HP sales representative.	

3. Submit the order to an HP sales representative.

Ordering Replacement Parts

If a part needs replacing, use the table below to determine the replacement part number. Customer installable part numbers indicate parts that can be replaced by the customer without voiding the warranty. All parts are replaceable by HP-qualified service personnel.

Table 16 Replaceable Parts: Part Numbers

Replaceable Part	Description	Part Number	Customer Installable Product Number
FC adapter	1063-Mbps short wave non-OFC FC adapter	A3308-69007	A3512A
Fan	Fan assembly (2 fans per unit)	A3308-60014	None
LCD unit	LCD/LED front panel display	A3308-60004	None
Optical port protector	Cover for the connector on the FC adapter	1005-0359	1005-0359
Memoryboard	Memoryboard, 8 Mbyte	A3308-69012	None
Motherboard	Motherboard	A3308-69001	None
Power supply	Auto-ranging power supply	0950-2989	None
SCSI adapter	16-Bit Fast-Wide SCSI PCA	A3308-69003	A3509A
Loopback Cable	2-meter loopback cable	1005-0624	1005-0624

Caution The optical port protector protects the adapter port when not in use; it is not for diagnostics use. To ensure accurate diagnostics, use the diagnostic loopback cable (part 1005-0624).

Table 17 Power Cord Part Numbers

Part Number	Description
8120-6869	Argentina
8120-1369	Australia
8120-6980	Chile
8120-2956	Denmark
8120-1689	Europe
8120-8325	Israel
8120-4753	Japan
8120-4211	South Africa and India
8120-2104	Switzerland
8120-1351	United Kingdom
8120-1751	USA 120V
8120-3996	USA 240V
8120-1396	International HP Internal CEE Cable .9 M (black)
8120-1575	International HP Internal CEE Cable .9 M (gray)

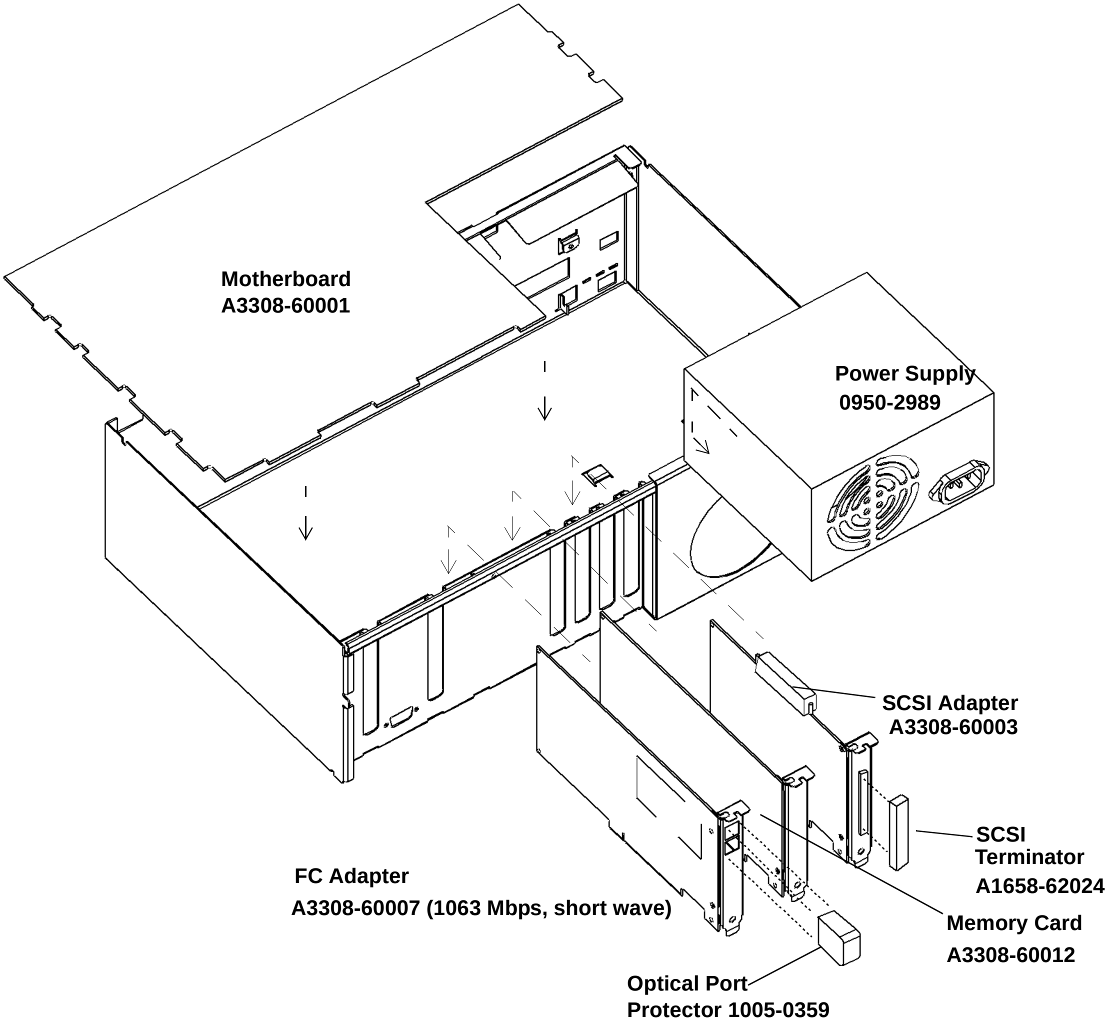


Figure 30 Replaceable Parts

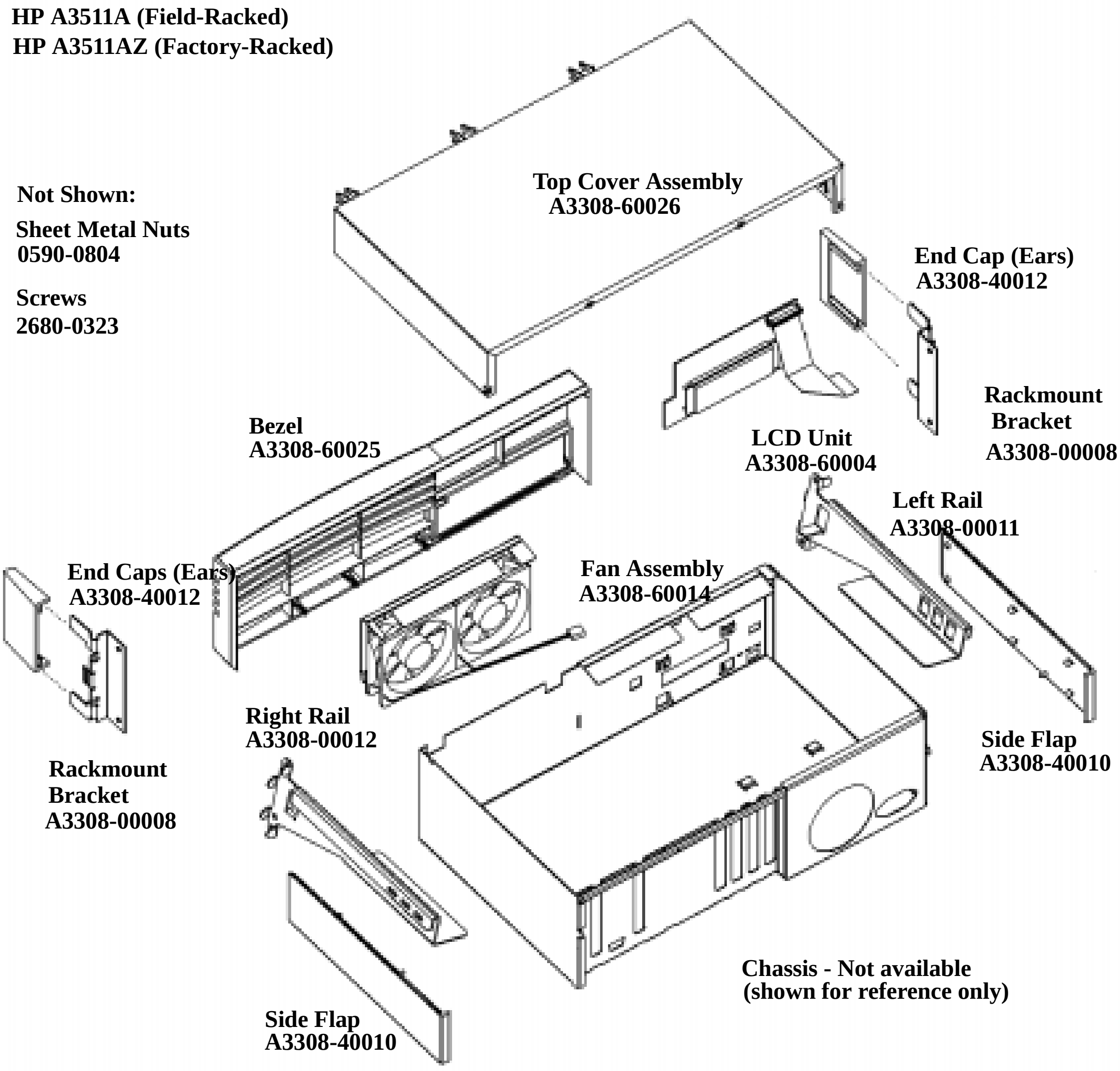


Figure 31 Replaceable Parts

Operating Requirements

Hardware and Software Requirements

- HP 9000 Servers with a High-Speed Connect (HSC) backplane
- The HSC FC adapter in the host or FC device must be of the same type as the FC adapter it connects to in the SSB. The SSB supports HP A3404A 1063-Mbps short wave and its corresponding fiber optic cable.
- HP-UX operating system release 10.20 or later. This release includes the FC mass storage driver required for the SSB. If release 10.20 or later is not installed, contact an HP sales representative or the Support Center. Refer to the adapter manual to make sure the driver is installed. To view the release and version of your operating system, type the following command at the host console: **uname -a**

  The release number is the third item in the output, as shown below:

  ```
  HP-UX sysname B.10.20 U 9000/804 ###### license
  ```

  The letter after the release number, “U” in this example, is the version and can vary with particular systems.

Peripherals Supported

Contact an HP sales representative for a list of supported SCSI peripherals. Certain peripherals may not be supported on some versions of operating systems.

Hardware Event Monitoring

The SSB is fully supported by Hewlett-Packard's Hardware Event Monitoring, which allows you to monitor all aspects of product operation and be alerted immediately if any failure or other unusual event occurs. Hardware event monitoring is available at no cost to users running HP-UX 10.20 or 11.0 and firmware revision 3840 or later.

Hardware event monitoring provides a high level of protection against system hardware failure. It provides an important tool for implementing high-availability strategy for your system. By using hardware event monitors, you can virtually eliminate undetected hardware failures that could interrupt system operation or cause data loss.

The hardware event monitoring software is distributed on IPR release 9812 or later. Complete information on installing and using hardware event monitoring is contained in the *Hardware Event Monitoring User's Guide*. A copy of this book can be accessed in the High Availability section of Hewlett-Packard's on-line documentation web site at **http://www.docs.hp.com**.

Environmental Specifications

Table 18 Environmental Specifications

Environment	**Limitations**
Temperature operating temperature nonoperating temperature	 +5 to 40°C -40 to 65°C
Humidity operating humidity nonoperating humidity recommended humidity	 20 to 80% noncondensing 5 to 80% RH @ 65° C 40 to 60% RH @ 22° C
Altitude operating altitude nonoperating altitude	 0 to 10K feet 0 to 15K feet
Power Line voltage range +/- 10% frequency range current power	 100, 120, 127, 200, 208, 230, 240 VAC 47.5 to 63 Hz 2.5A; 100-127v AC 1.5A; 200-240v AC 190 watts
Heat Dissipation	650 BTU/hr 165 kcal/hr

Physical Characteristics

The estimates in the following table are based on the standalone SSB with one FC plus one SCSI adapter.

Table 19 Model HP A3308A Dimensions and Weight

Characteristic	Product Alone	Packaged Product
Height	13.36 cm (5.25 in)	36.20 cm (14.25 in)
Width	44.20 cm (17.38 in)	61.26 cm (24.12 in)
Depth	28.47cm (11.21 in)	45.72 cm (18.00 in)
Weight	7.7 Kgm (17 lb)	10.7 Kgm (24 lbs)
Racked height	4 EIAs	N/A

Regulatory Statements

A. FCC Statement (For U.S.A. Only)

The Federal Communications Commission (in 47 CFR 15.105) has specified that the following notice be brought to the attention of the users of this product.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

B. IEC Statement (Worldwide)

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

C. DOC Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique do la classe A respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

D. Spécification ATI Classe A (France)

DECLARATION D’INSTALLATION ET DE MISE EN EXPLOITATION d’un matériel de traitement de l’information (ATI), classé A en fonction des niveaux de perturbations

radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

Cher Client,

Conformément à la Réglementation Française en vigueur l'installation ou le transfert d'installation, et l'exploitation de cet appareil de classe A, doivent faire l'objet d'une déclaration (en deux exemplaires) simultanément auprès des services suivants:

- Comité de Coordination des Télécommunications 20, avenue de Ségur - 75700 PARIS
- Préfecture du département du lieu d'exploitation

Le formulaire à utiliser est disponible auprès des préfectures.

La déclaration doit être faite dans les 30 jours suivant la mise en exploitation.

Le non respect de cette obligation peut être sanctionné par les peines prévues au code des Postes et Télécommunications et celles indiquées dans la loi du 31 mai 1993 susvisée.

Arrêté du 27 Mars 1993, publié au J.O. du 28 Mars - ATI

E. Product Noise Declaration (Germany)

Acoustic Noise Emissions

LpA: 4.8 Bels

At bystander position per ISO 7779.

All data are the results from type tests of the product configuration having the highest acoustic emissions.

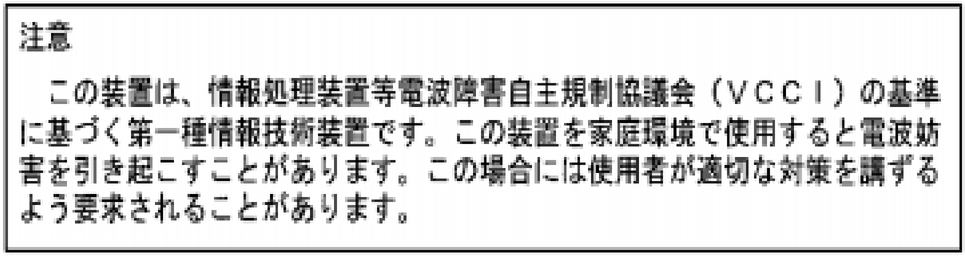
Geräuschemission

LpA: 4.8 Bels

Am fiktiven Arbeitsplatz nach DIN 45635 T. 19.

Die Daten sind die Ergebnisse von Typprüfungen an Gerätekonfigurationen mit den höchsten Geräuschemissionen.

F. VCCI Statement (Japan)



注意

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づく第一種情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Laser Safety

A. Certification and Classification Information

This product contains a laser internal to the Optical Link Card/Optical Link Module (OLC/OLM) for connection to the Fibre communications port.

In the USA, all models of the OLC/OLM are certified as Class 1 laser product and conform to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR Subchapter J. The certification is indicated by a label located on the plastic OLC/OLM housing.

Outside the USA, all models of the OLC/OLM are certified as Class 1 laser components that conform to the requirements contained in the International Electrotechnical Commission (IEC) standard 825 (1994) and Amendment 1 (1990) along with the CENELEC (European Committee for Electrotechnical Standardization) European Normalization Standard EN 60825 (1992).

Certifications include one or more of the following: Recognized Component by Underwriters Laboratories, Certified by the Canadian Standards Association, Certified by VDE (Germany) and/or Certified by Statens Provningsanstalt (SP) in Sweden.

The following figure shows the Class 1 information label specified in IEC 825 and CENELEC HD 482 51.

Class 1 Laser Product

Laser Klasse 1

Luckan 1 Laserlaite

Class 1 laser products are not considered hazardous.

B. Product Information

Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains internally a semiconductor laser diode in the wavelength of 780 nanometers.

WARNING **There are no user maintenance or service operations or adjustments to be performed on any OLC/OLM model.**

C. Usage Restrictions

Failure to comply with these usage restrictions may result in incorrect operation of the system and points of access may emit laser radiation above the Class 1 limits established by the IEC and U.S. DHHS.

D. Laser Safety (Finland) LASERTURVALLISUUS

LASERTURVALLISUUS
LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

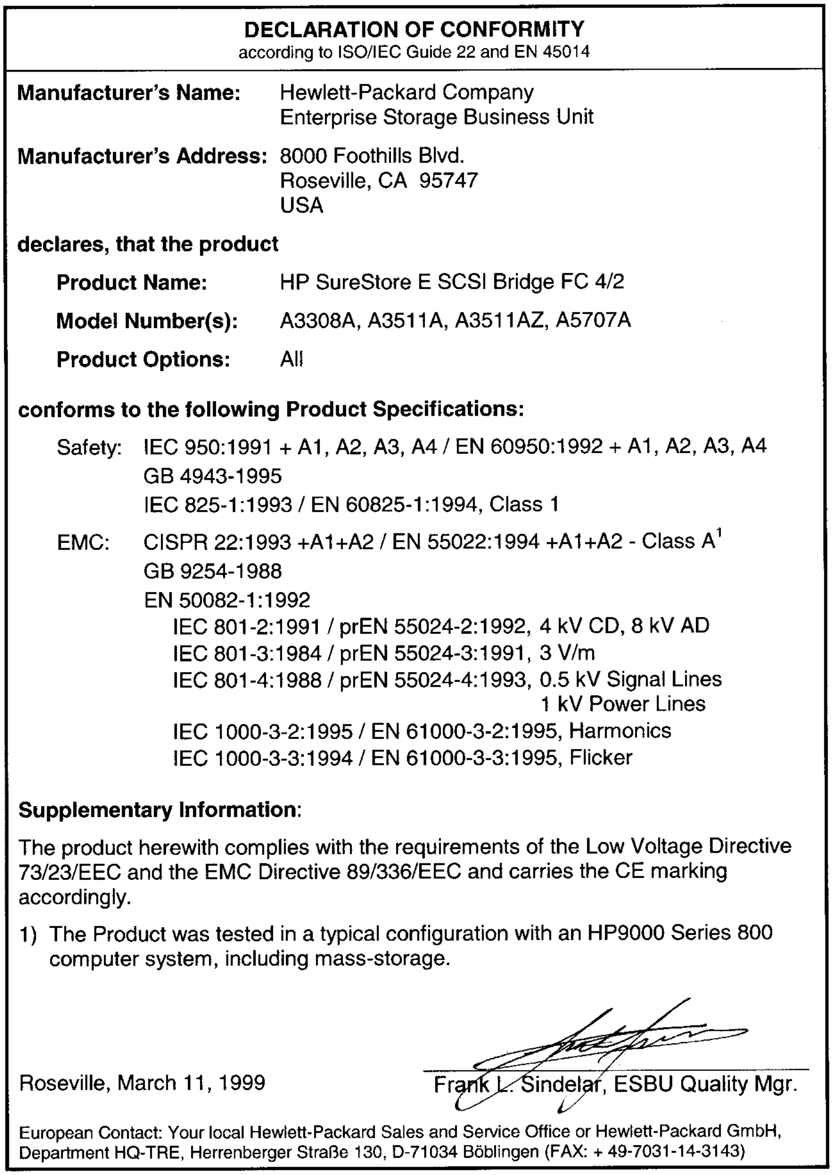
Fibre Channel 1063 MBaud Optical Link-kortille on asennettu optista tiedonsiirtoa varten laserlähetin, joka lähettää signaalit siihen kytketyn optisen kuidun kautta. Normaalissa toimintatilassa lähetin on käyttäjälle turvallinen luokan 1 laserlaite, eikä käyttäjä voi altistua sen lähettämälle säteilylle. Optisen lähetinmoduulin turvallisuusluokka on määritetty standardin

EN 60825 (1991) mukaisesti.

Optisessa lähetinmoduulissa ei ole huollettavia kohteita eikä sen tehtaalla tehtyjä säätöjä tule muuttaa. Lähetinmoduuli on myös suunniteltu siten, että turvallisuusluokan 1 säteilyrajat eivät ylity, vaikka lähetinmoduuliin kytketty optinen kuitu rikkoutuu tai kytketään irti lähettimen toimiessa. Lähetinmoduulin turvallisen toiminnan varmistamiseksi on noudatettava tarkoin sen asentamisesta ja toiseen vastaanottavaan laitteistoon kytkemisestä annettuja ohjeita. Tiedot optisessa lähetinmoduulissa käytettävien laserdiodien säteilyominaisuuksista:

Aallonpituus
(SW) 780 nm

Declaration of Conformity



DECLARATION OF CONFORMITY
according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Enterprise Storage Business Unit

Manufacturer's Address: 8000 Foothills Blvd.
Roseville, CA 95747
USA

declares, that the product

Product Name: HP SureStore E SCSI Bridge FC 4/2

Model Number(s): A3308A, A3511A, A3511AZ, A5707A

Product Options: All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2, A3, A4 / EN 60950:1992 + A1, A2, A3, A4
GB 4943-1995
IEC 825-1:1993 / EN 60825-1:1994, Class 1

EMC: CISPR 22:1993 +A1+A2 / EN 55022:1994 +A1+A2 - Class A[1]
GB 9254-1988
EN 50082-1:1992
IEC 801-2:1991 / prEN 55024-2:1992, 4 kV CD, 8 kV AD
IEC 801-3:1984 / prEN 55024-3:1991, 3 V/m
IEC 801-4:1988 / prEN 55024-4:1993, 0.5 kV Signal Lines
1 kV Power Lines
IEC 1000-3-2:1995 / EN 61000-3-2:1995, Harmonics
IEC 1000-3-3:1994 / EN 61000-3-3:1995, Flicker

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.

1) The Product was tested in a typical configuration with an HP9000 Series 800 computer system, including mass-storage.

Roseville, March 11, 1999

Frank L. Sindelar, ESBU Quality Mgr.

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Related Documents

The following documentation contains information related to the SSB:

- Installation:
  - *HP Fibre Channel Mass Storage Adapters Service and User Manual* (A3636-90002)
  - *Configuring HP-UX for Peripherals (HP 9000)* (B2355-90053)
- Administration and troubleshooting:
  - *SureStore E SCSI Bridge FC 4/2 Control Panel Quick Reference* (A3308-90006)
  - *HP-UX System Administration Tasks Manual* (B2355-90079)
  - *Support Tools Manager User's Manual HP 9000 Series 700 and Series 800 PA-RISC Computer Systems* (5961-1612)
- Fibre Channel technology:
  - *Fibre Channel Connection to the Future* ISBN 1-878707-19-1
  - *What Is Fibre Channel?* ISBN 0-9637439-0
  - *The Fibre Channel Consultant: Arbitrated Loop* ISBN 0-931836-82-4

APPENDIX

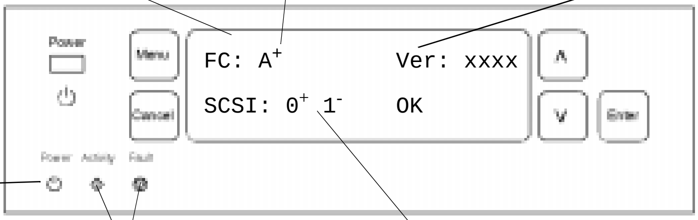
SSB Control Panel Quick Reference

Slot Status Screen Example

Slot locations of FC A and B, and SCSI 0,1, 2 and 3. Only the adapters detected by the SSB are displayed.

+ FC is online
– FC is offline
? FC is trying to communicate with the host

SSB revision number



On = green

See table 5

+ SCSI adapter 0 is online
– SCSI adapter 1 is offline

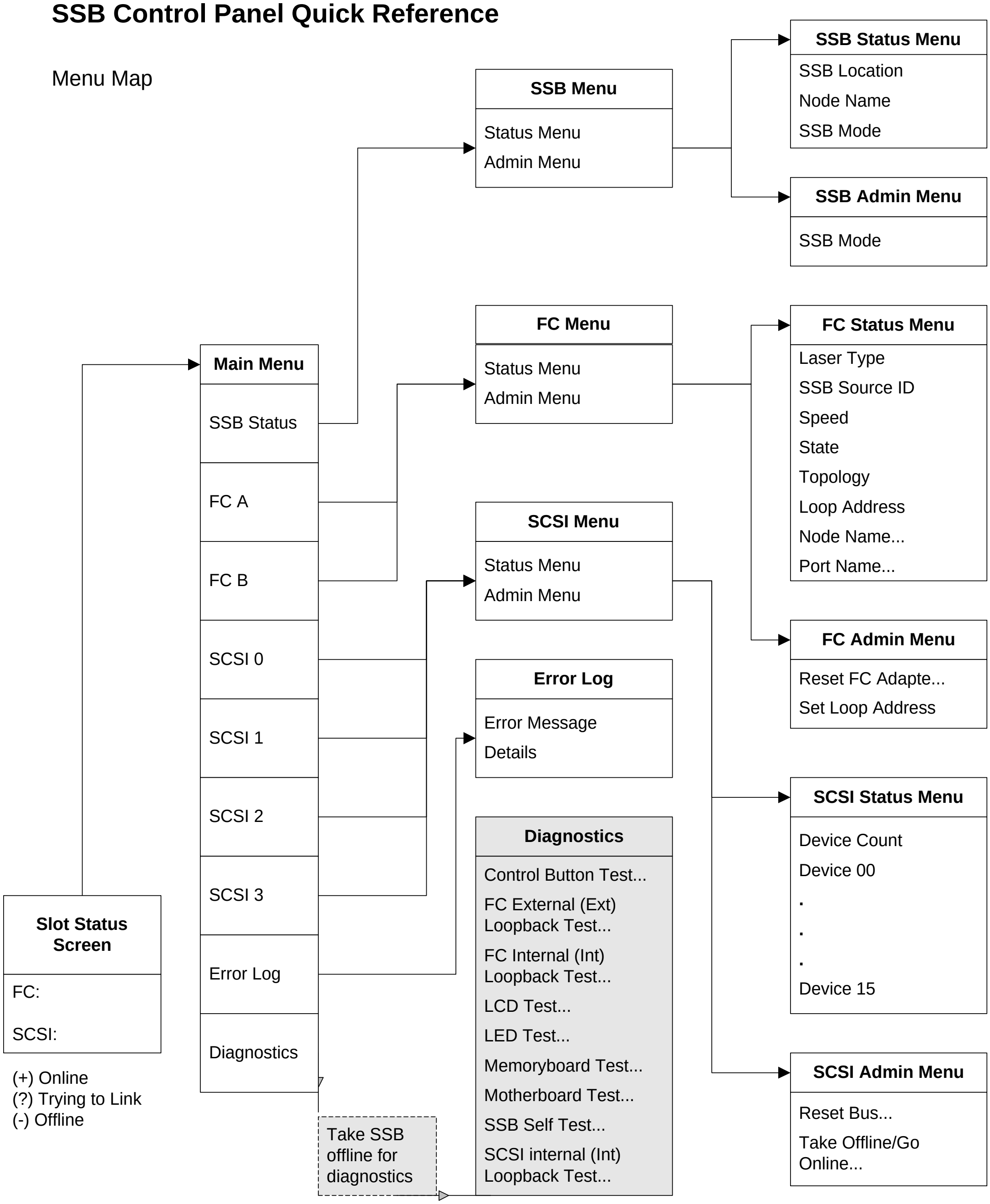
Using the Control Panel

Use the control panel buttons to navigate through the Main Menu and control SSB functions. The other side of this card shows the menu hierarchy.

Power ☐	– Power-cycles the SSB and initiates SSB self test.
Menu	– Displays the Main Menu.
^ **v**	– Scrolls up or down.
Enter	– Selects a menu or option, or performs a task.
Cancel	– Cancels a selection and returns to the previous screen.

SSB Control Panel Quick Reference

Menu Map



GLOSSARY

Activity LED

This LED shows that the SSB is receiving and transmitting data. When the SSB is powered on, it runs a self test. During this time, the Activity LED comes on for a few seconds and then goes off. During normal operation, if the SSB is processing inputs/outputs, this LED blinks. If the SSB is not processing inputs/outputs, the LED remains off.

Adapter

A printed circuit assembly that translates data between the host processor's internal bus and a different bus, such as SCSI.

Address

See *SCSI Addressing*.

Arbitrated Loop

See *Fibre Channel - Arbitrated Loop*.

Area

The second byte of the N_Port Identifier.

Baud

The encoded bit rate per second.

Bus

A means of transferring data between modules and adapters or between an adapter and SCSI devices. For a SCSI bus definition, see *SCSI Bus*.

Channel

A general term for a path on which electronic signals travel.

Clusters

Two or more computers sharing the same resources on a communication link.

Control Panel

A panel located on the front of the SSB that contains buttons, LEDs, and an LCD showing the status of the FC and SCSI ports. It enables users to run self test and troubleshoot the SSB.

Device

See *FC Device* or *SCSI Device*.

Diagnostics

A menu name. It is used to select and test SSB-related hardware assemblies, such as an FC adapter, a SCSI adapter, the Motherboard, the Memoryboard, etc. It is also used to view the error log and to return online.

Differential

An electrical signal configuration using a pair of lines for transfer. The advantage of differential compared to single-ended is a relative high tolerance for common-mode noise and little crosstalk when used with twisted pair cables.

Domain

The most significant byte in the N_Port Identifier for the FC device. It is not used in the FC-SCSI hardware path ID. It is required to be the same for all SCSI targets logically connected to an FC adapter.

Enclosure

The box, rack, or set of boxes containing one or more SCSI devices. It may provide the powering, cooling, mechanical support, and external electronic interfaces for those devices.

ERR

An error message. An ERR reported for the LCD indicates the SSB has encountered an internal error. If an ERR occurs, the SSB cannot process data but can communicate with the host, and its menu functions are still available.

Exchange

The basic mechanism used for managing a Fibre Channel operation. An exchange identifies information transfers consisting of one or more related nonconcurrent sequences that may flow in the same or opposite directions, but always in half duplex mode. An exchange may span multiple Class 1 dedicated connections. An exchange is identified by an OX_ID and an RX_ID.

Fabric

An FC term describing a crosspoint switched topology, which is one of the three existing FC topologies. Fabric elements interconnect various N_Ports and are responsible for frame routing.

Fast/Wide SCSI

“Fast” and “Wide” are relative terms in comparing previous SCSI standards and products. “Fast,” as defined in SCSI-2, refers to a maximum synchronous transfer rate of 10 MHz. “Wide” refers to a 16-bit or 32-bit data path.

Fatal Error

A message reported for the LCD indicating the SSB is not functional. The SSB cannot communicate with the host. The diagnostics may not be functional.

Fault LED

During power up and self test, the Fault LED comes on. After self test, if this LED remains on or comes on, the SSB has a problem with one of its components. During normal operation, this LED should be off. When the SSB is offline, this LED blinks.

FC A or FC B

The slot location in the SSB for a Fibre Channel adapter.

FC Admin

A menu name. It is used to reset the Fibre Channel adapter and gracefully terminate all inputs/outputs pending for this adapter.

FC-AL

See *Fibre Channel - Arbitrated Loop*.

FC adapter

A printed circuit assembly that translates data between the host processor's internal bus and the Fibre Channel link.

FC Device

A device that uses Fibre Channel.

FC Port

An opening at the back of the SSB that provides connection between the Fibre Channel adapter and the Fibre Channel link.

FC-SCSI Hardware Path ID

A list of values showing the physical hardware path of the host to the target device.

Format: `Bus_Converter/Adapter_Address.Protocol_Type.Area.Port.Bus.Target.LUN`

Example: `8/4.8.0.0.2.4.0`

See Configuring the SSB on page 54 to interpret the elements of the hardware path.

FC Status

A menu name. It is used to show the status of the link, the node name, the port name, the topology, and the laser speed.

Fiber

The fiber optic cable made from thin strands of glass through which data in the form of light pulses is transmitted (LASER, LED). It is used for high-speed transmission over medium to long distances.

Fibre Channel (FC)

Logically, a bidirectional, full-duplex, point-to-point, serial data channel structured for high performance capability. Physically, the Fibre Channel is an interconnection of multiple communication ports, called N_Ports, interconnected by a switching network, called a fabric, a point-to-point link, or an arbitrated loop. Fibre Channel is a generalized transport mechanism that has no protocol of its own or native input/output command set, but can transport any existing Upper Level Protocols (ULPs) such as SCSI and IPI. Fibre Channel operates at speeds of 100 Mbytes/sec (full speed), 50

Mbytes/sec (half speed), 25 Mbytes/sec (quarter speed) or 12.5 Mbytes/sec (eighth speed), over distances of up to 100 m over copper media or up to 10 km over optical links.

Fibre Channel - Arbitrated Loop (FC-AL)

One of three existing Fibre Channel topologies, in which two to 126 devices are interconnected serially in a single loop circuit. The arbitrated loop topology supports all classes of service and guarantees in order delivery of frames when the source and destination are on the same loop.

Fibre Channel Protocol for SCSI (FCP)

FCP defines a Fibre Channel mapping layer (FC-4) that uses FC-PH services to transmit SCSI command, data, and status information between a SCSI initiator and a SCSI target. Using FCP enables transmission and receipt of SCSI commands, data and status, across the Fibre Channel using the standard Fibre Channel frame and sequence formats.

Frame

The smallest, indivisible unit of information transfer used by FC-2. Frames are used for transferring data associated with a sequence. Frame size depends on the hardware implementation and is independent of the ULP or the application software. Frames begin with a 4-byte Start of Frame (SOF), end with a 4-byte End of Frame (EOF), include a 24-byte frame header and a 4-byte Cyclic Redundancy Checker (CRC), and can carry a variable data payload from 0 to 2112 bytes, the first 64 of which can be used for optional headers.

Gigabit Link Module (GLM)

A physical component that manages the functions of the FC-0 layer, which is the physical characteristics of the media and interface, including drivers, transceivers, connectors, and cables. Also referred to as a Physical Link Module (PLM).

Hardware Path

See *FC-SCSI Hardware Path ID*.

Host Adapter

See *adapter*.

Initiator

A SCSI device (usually a host system) that requests an operation to be performed by another SCSI device known as the target (for example, a SCSI disk or tape drive).

LCD (liquid crystal display)

A readout device in which each digit is formed by strips of polarizing liquid-crystal material.

Link

For Fibre Channel, a connection between two nodes, each having at least one N_Port, interconnected by a pair of optical or copper links, one inbound and one outbound.

Long Wave

Lasers or LEDs that emit light with wave lengths around 1300 nm. Long-wave lasers are used for long Fibre Channel links, from ~700 to 2000 m. They are typically used with single-mode, 9-micron core size fibre.

Loop Address

The unique ID of a node in Fibre Channel loop topology, sometimes referred to as a Loop ID. Also a status type in the FC Status Menu, showing the Loop Address of the FC-SCSI SSB.

Loop Port (L_Port)

An N_Port or F_Port that supports arbitrated loop functions associated with arbitrated loop topology.

LUN

Logical Unit Number or Logical Unit; a subdivision of a SCSI target. For SCSI-2, each SCSI target supports up to eight LUNs (LUN-0 to LUN-7). Using LUNs, the host can address multiple peripheral devices that may share a common controller.

Main Menu

The highest level menu on the control panel of the FC-SCSI SSB. Under the Main Menu are the menus for the FC adapters, SCSI adapters, Error Log, and Diagnostics.

Memoryboard

A printed circuit assembly in the SSB containing RAM and other design features enabling maximum data throughput speeds.

Menu Names

The names of the menus, available through the control panel. The menu functions are used to view status, perform administration tasks, review the Error Log, and troubleshoot the SSB. These menus include the following: Slot Status Screen, Main Menu, the FC Status, FC Admin, SCSI Status, SCSI Admin, Error Log, and Diagnostics.

Motherboard

The main PCA of the SSB that provides a physical and logical connection between Fibre Channel and SCSI devices.

N_Port

A "Node" port. A Fibre Channel-defined hardware entity that performs data communication over the Fibre Channel link. It is identifiable by a unique Worldwide Name. It can act as an originator or a responder.

N_Port Identifier

A unique address identifier by which an N_Port is uniquely known. It consists of a Domain (most significant byte), an Area, and a Port, each 1 byte long. The N_Port identifier is used in the Source Identifier (S_ID) and Destination Identifier (D_ID) fields of a Fibre Channel frame.

Node Name

A field value under the FC Status Menu. The unique identifier, a 64-bit value, the factory assigns to the MUX. For more detailed information, see N_Port or N_Port Identifier.

Offline

Taking a SCSI adapter offline means terminating inputs/outputs and suspending all transactions going from the SSB to the specified SCSI devices. The SCSI adapter is no longer active or available for access. Taking the SSB offline indicates that all SCSI and Fibre Channel adapters in the SSB are offline.

Online

For a SCSI adapter, online indicates the SCSI adapter is active and available for access and input/output processing. For the SSB, online indicates that at least one adapter in the SSB is active and available for access.

Originator

The Fibre Channel N_Port responsible for starting an exchange. A Fibre Channel originator is comparable to a SCSI initiator.

Point-to-Point

One of three existing Fibre Channel topologies, in which two ports are directly connected by a link with no fabric, loop, or switching elements present. The SSB supports only loop topology.

Port Name

A field value under the FC Status Menu; the Fibre Channel port identifier; a 64-bit value the factory assigns to each Fibre Channel adapter.

Reset SCSI

For a specific SCSI bus, the host clears all inputs and outputs and then resets the bus and all the devices connected to it.

Responder

The logical function in an N_Port responsible for supporting the exchange initiated by the originator in another N_Port. A Fibre Channel responder is comparable to a SCSI target. The SSB is often the responder.

SCSI

Small Computer System Interface. An industry standard for connecting peripheral devices and their controllers to a microprocessor.

SCSI Adapter

An adapter used by the SSB that communicates with SCSI devices. Typically, a 16-bit fast/wide differential or 8-bit narrow single-ended physical connection.

SCSI Addressing

A fast/wide SCSI adapter supports up to 16 devices, including itself. Each device has its own unique SCSI address. The SCSI address of a device dictates the device's priority when arbitrating for the SCSI bus. SCSI address "7" has the highest priority. The next highest priority address is "6" followed by 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, 8, with "8" being the lowest priority address. The fast/wide SCSI adapter is factory set to address 7. A narrow SCSI adapter supports up to eight devices, including itself. SCSI address "7" has the highest priority followed by 6, 5, 4, 3, 2, 1, and 0.

SCSI Admin

A menu name used to reset the SCSI bus or take the SCSI bus offline.

SCSI Bus

The means of transferring SCSI data between SCSI devices. It is an 8-bit or 16-bit bus that supports up to eight or sixteen devices (including itself), in any mix of initiators and targets, with the limitation that at least one initiator and one target must be present.

SCSI Device

A single unit on the SCSI bus, identifiable by a unique SCSI address. A SCSI device can act as an initiator or target. For SCSI-2, each SCSI device supports up to eight LUNs.

SCSI Port

An opening at the back of the SSB providing connection between the SCSI adapter and the SCSI bus.

SCSI Status

A menu name used to show the number of SCSI devices on the bus.

Short Wave

Lasers or LEDs that emit light with wavelengths around 780 nm or 850 nm. Short-wave lasers are used for Fibre Channel links up to ~700 m. They are typically used with multimode fibre. The preferred fibre core size is 50 micron as this fibre has large bandwidth so that the distance is limited by the fibre attenuation. A 62.5 micron core size is also supported for compatibility with existing FDDI installations. Fibre of this type has smaller bandwidth and, in this case, the distance is limited by the fibre bandwidth.

Single-Ended

An electrical signal configuration using a single line for each signal, referenced to a ground path common to the other signal lines. The advantage of single-ended configuration compared to differential is in using less circuitry and PCA area. Its disadvantage is higher vulnerability to common mode noise and limited cable distance.

Slot

A physical connector and location in the SSB for a Fibre Channel or SCSI adapter. Four slots are available for SCSI adapters and two for Fibre Channel adapters.

Slot Cover

A metal strip that fills the opening of an empty adapter slot.

Slot Status Screen

The main menu showing which Fibre Channel and SCSI adapters are installed in the SSB. It also shows which adapters are online (+), offline (-), or attempting to communicate with the host (?). These indicators follow the identification of the adapter.

Speed

A status type in the FC Status Menu showing the speed (266 or 1063 Mbps) of the Fibre Channel adapter.

SSB

A device that enables SCSI devices to interface directly with hosts that have Fibre Channel technology. The SSB contains one or two Fibre Channel ports and up to four fast/wide SCSI differential ports. It supports FCP for Class 3 Services and loop Fibre Channel topology. It supports up to 500-meter distance using multimode and short-wave optics.

SSB Location

A feature that allows the Hardware Event Monitoring application to identify which SSB is experiencing trouble. The SSB Location accepts up to 20 characters. Allowable characters are: An example is: Building5 rack3 SSB2. If a SSB Location is not created it would default to the World Wide Name.

SSB Source ID

A status type in the FC Status Menu. It is the N_Port Identification of the SSB that is sending data to the host. For point-to-point or unrecognized topology, the SSB Source ID is undefined and shown as “N/A” on the SSB’s LCD.

State

A status type in the FC Status Menu showing whether the Fibre Channel link between the host and the SSB is up or down.

Target

A SCSI device (usually the peripheral) that responds to an operation requested by a SCSI initiator (usually the host system). SCSI peripherals are targets, but for some commands (for example, a COPY command), the peripheral may need to act temporarily as an initiator.

Terminator Block

An electrical connection at each end of the SCSI bus composed of a set of resistors (or possibly other components). Its function is to provide a pull-up for open collector drivers on the bus, and also impedance matching to prevent signal reflections at the ends of the cable. The SCSI bus requires termination at both ends of the bus. One end of the SCSI bus is terminated by the adapter’s internal termination. The other end should have a terminator placed on the 68-pin high density SCSI connector on the last SCSI peripheral. If this device is not terminated, data errors may occur.

Topology

The physical or logical layout of nodes on a network. FC topologies include point-to-point, FC-AL, and Fabric. The SSB supports FC-AL topology.

A status type in the FC Status Menu showing the type of FC topology being used.

View Node Name

A status type in the FC Status Menu showing the identification of the node.

View Port Name

A status type in the FC Status Menu showing the identification of the port.

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Reader Comment Sheet

Hewlett-Packard SureStore E SCSI Bridge FC 4/2 Service and User Manual

We welcome your evaluation of this manual. Your comments and suggestions will help us improve our publications. Remove this page and mail or FAX it to 916-785-2875. Use and attach additional pages if necessary.

	Agree				Disagree	N/A
The manual is well organized.	○	○	○	○	○	○
The information is technically accurate.	○	○	○	○	○	○
Information is easy to find.	○	○	○	○	○	○
Step-by-step procedures are easy to perform.	○	○	○	○	○	○
There are enough examples and pictures.	○	○	○	○	○	○
The examples and pictures are useful.	○	○	○	○	○	○

Comments ____

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